ELECTRICAL REVIEW

2nd OCTOBER, 1953

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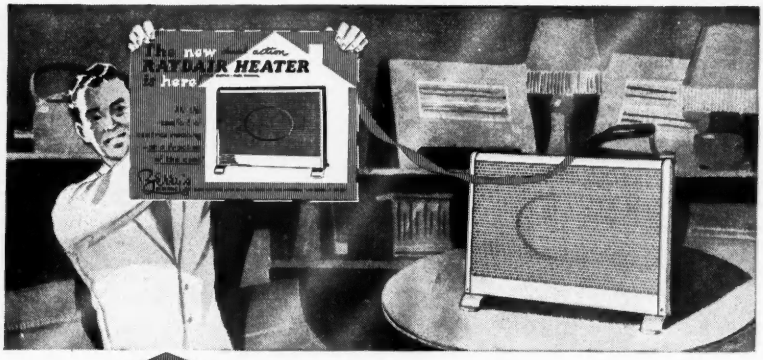

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ELECTRICAL REVIEW 2nd OCTOBER, 1953

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. 153 • NO. 14

Electricity Supply Progress

STEADY continuance of engineering trends observable in previous reports are indicated in the fifth annual report of the British Electricity Authority, which is reviewed in this issue. The effect of the largest increase in generating capacity installed in any one year is reflected in a higher average thermal efficiency and hence an increased consumption of coal that is appreciably less than proportionate to the increase in the kWh produced. The percentage rise in output fell short of that of the previous year, and was notably less than that reached in 1950–51. The main reasons were a smaller rise in industrial production on the one hand and hire-purchase restrictions on the other. Some part at least of the slackening of the rate is no doubt attributable to a probably fleeting success of the notorious anti-electricity campaign. It serves as a reminder, however, of the efforts needed to take every advantage of easing of restrictions to restore conditions essential for avoiding increases in the price of electricity to consumers in all classes, since the load factor and plant utilization factor have been adversely influenced.

Higher costs of coal and its transport were accompanied by a somewhat lower calorific value. The latter need cause no concern in so far as it relates to a more extended use of inferior qualities (provided these are consistent), a trend that is likely to become more pronounced in future in view of collaboration with the National Coal Board in the combustion of colliery waste. Exploitation of other power resources is receiving the Authority's attention; some of these may be expected to save some coal, though usually at a disproportionate cost, but not to add materially to the firm kilowatts. Considerably improved flexibility should follow the construction of the 275 kV grid, which will, like the 132 kV system, furnish a valuable testing ground for British made apparatus in the eyes of foreign purchasers.

The overall financial aspect seems satisfactory. The Central

Authority reports a surplus of £5,824,452. Moreover, only six of the Area Boards (against eight) incurred deficits and the general position has improved, for the Boards together earned a net surplus of £1,456,371 (against a deficit of £1,332,803). The B.E.A. has managed to complete its first statutory five, and very difficult, years of existence with a credit balance of £17·42 million and in addition has set aside in that period £10·91 million for taxation. This five-year net surplus of £28·33 million is small in relation to the huge revenue involved, but it is not the purpose of the Authority and Boards to make profits. They need only a prudent margin to ensure financial stability after giving efficient service to consumers.

PAY AND PRODUCTION

Sir Harry Railing, at the annual meeting of the General Electric Co., Ltd., last week, presented in clear terms the dilemma which faces not only the G.E.C. but other concerns which rely substantially on export business. Increased wages, without a corresponding rise in output per man, are sending up costs. Prices are already high enough and in any event foreign competition will prevent any further rise. In relation to the real capital involved the profits of most companies are not excessive. It is quite clear that a point has been reached where, if British exports are to be maintained, the payment of ever-higher wages cannot go on unless production increases proportionately.

DOMESTIC DEPRESSION

The continued progress of the G.E.C. in production and sales was attributable entirely to capital equipment. In common with other producers, the company was affected by the unsatisfactory conditions surrounding " consumer " goods, both at home and overseas. It was perhaps not quite fair of Sir Harry Railing to place the blame for the fall in sales of domestic appliances entirely on the British Electricity Authority. Its policy of non-encouragement (not a ban) was forced on it partly by the generating plant position and mainly by the Minister of Fuel and Power, for various reasons. Now the Electricity Boards are doing their best to recover lost ground and no doubt the results will be seen in an improvement in the affairs of domestic appliance makers.

MUTUAL BENEFIT

The jubilee of the Rugby Engineering Society last week was fittingly held at the Rugby College of Technology and Arts, since the former body has long provided a channel for the close co-operation that exists between local electrical industries and technical education. Engineering training is thus firmly " industry based " to the advantage of both parties, as was made plain by the exhibition of Rugby's contribution to electrical advance over the past half century. Recognition of the value of this close connection is also indicated by generous provision of equipment for the College and by the release of students for day study.

BOILER BONDED DEPOSITS

Although the amount of fly ash produced from oil firing is much less than that from coal, the particles bonded in a matrix of sulphates of sodium which adheres to high temperature surfaces (especially superheaters) similarly reduces boiler availability by fouling gas passages. Tests carried out on small oil-fired boilers by the British Coal Users' Research Association and described in the *Journal of the Institute of Fuel* confirm the efficacy of zinc oxide " smokes " in lowering acid dewpoint, as with coal firing. Unfortunately their use is unlikely to be economic in either case. With coal the absorption of sulphur trioxide by dust from precipitators seems a possibility.

Britain's Electricity Supply

The B.E.A.'s Annual Report

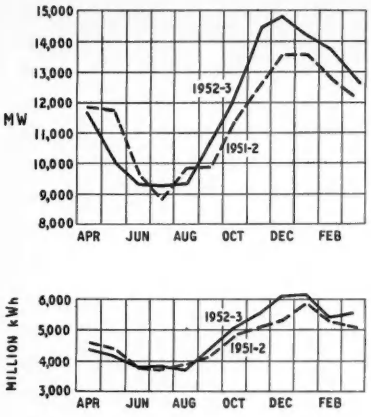
THE fifth Report and Statement of Accounts of the British Electricity Authority, which was published on Tuesday, covers the twelve months ended 31st March last. During that period 61,600 million kWh was generated at the 285 power stations of the Authority, an increase of 4 per cent over 1951–52 and of 47 per cent over 1947–48. These stations contained 17,157 MW of generating sets, including 1,423 MW of new plant compared with 1,192 MW in the previous year. Allowing for auxiliaries, removal of obsolete plant (95 MW) and technical limitations, the effective output capacity amounted to 15,302 MW. More than 15 per cent of the total capacity consisted of out-of-date plant over 25 years of age.

New installations in seven new stations and 23 existing stations were commissioned. In six new stations turbine stop valve steam pressure was 900 lb/sq in. A 15 MW gas turbine set at Trafford power station was run experimentally. Construction programmes from 1953 to 1958 provide for a total additional capacity of 7,134 MW, bringing the aggregate amount planned since vesting day to 13,159 MW by the end of 1958. Power station capital contracts approved by the Authority in 1952–53 amounted to £96 million compared with £89 million in the previous year.

During the year designs were put in hand for 100 MW sets with steam conditions of 1,500 lb/sq in and 1,050 deg F for Willington "A" station (Derby) and 120 MW reheat sets at 1,500 lb/sq in and 1,000 deg F for Blyth and Drakelow "B" (Burton-on-Trent) stations. In the last two each turbo-alternator will be associated with a single 860 klb/hr boiler. At these high temperatures sodium and potassium salts present in many coals, particularly those from the increasingly important East Midland coalfields, are liable to form bonded deposits on the heating surfaces of boilers (thus reducing availability) in the present state of knowledge and is now the subject of active research.

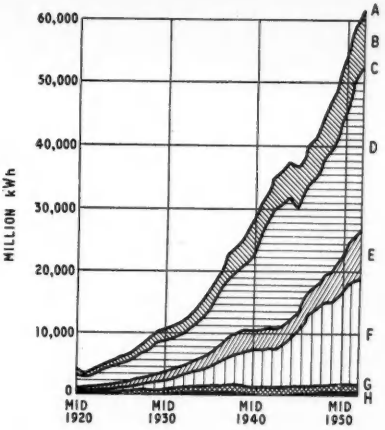
Steam stations were responsible for 99·38 per cent of the kWh generated by the B.E.A. Technical details and costs of these for the past two years are shown in Table I and are compared with those for the last pre-vesting year. The three stations showing the highest thermal

The title photograph shows a section of the 275 kV supergrid



MONTHLY MAXIMUM POTENTIAL DEMAND AND MONTHLY OUTPUT

The two upper curves show the average demand for electricity (whether wholly supplied or not) on power stations over the half-hour of maximum demand in each month. The two lower curves show the quantity of electricity sent out in each month



GROWTH OF PUBLIC ELECTRICITY SUPPLY, 1920-52

A—Units generated at public supply power stations. B—Units used in power stations, main transmission and distribution, less purchases from outside sources. C—Total sales to consumers. D—Sales for industrial purposes. E—Sales for commercial purposes (shops, offices, public buildings, hotels, etc.), including combined domestic and commercial supplies. F—Sales for domestic and farm purposes. G—Sales for railway and street traction. H—Sales for public lighting. The diagram shows calendar year totals plotted at mid-year

efficiencies were Littlebrook "B" (29·91 per cent), Dunston "B2" (29·76 per cent) and Bromborough (29·33 per cent). The average for the 20 stations of highest efficiency was 27·09 per cent and for all B.E.A. stations 22·04, as against 21·54 in the previous year and 20·87 in the pre-vesting year, since when the coal saving has amounted to 7¼ million tons.

The Authority ordered 50 MW of diesel-generators for installation by the end of 1954; the original figure of 100 MW was scaled down as such plant could not be installed as quickly or as cheaply as

Table I.—Steam Power Stations: Technical Details and Costs

Technical Details		1947–48	1951–52	1952–53
Number of steam power stations at 31st March		201	207	209
Maximum output capacity	MW	11,921	13,979	15,302
Electricity generated	million kWh	41,311	58,704	61,174
Electricity used in power stations	million kWh	2,406	3,431	3,645
Electricity sent out	million kWh	38,906	55,273	57,528
Ratio of average load to maximum output capacity	per cent	40·95	46·87	44·69
Generation employees	per MW, o.c.	2·69	2·53	2·36
Average B.Th.U./lb of fuel		10,937	10,928	10,854
Average delivered price	d/ton	568·9	676·0	710·3
Fuel consumed, total	1,000 tons	25,965	34,958	35,533
Fuel consumed	lb/kWh s.o.	1·495	1·417	1·384
Average thermal efficiency	per cent	20·87	22·04	22·72
Heat rate	B.Th.U./kWh s.o.	16,350	15,482	15,016
Average works costs per kWh s.o., pence:				
Fuel, including transport		0·3797	0·4276	0·4387
Fuel handling		0·0249	0·0237	0·0245
Operation salaries and wages		0·0318	0·0337	0·0356
Oil, water and stores		0·0038	0·0037	0·0039
Repairs and maintenance		0·0385	0·0419	0·0419
Total works costs		0·4787	0·5306	0·5446

The figures relate to all plant contained in power stations where the bulk of generation is by steam raised from fuel: for the years ended 31st March, 1949–52, to stations owned by the Central Authority, and for the year ended 31st March, 1948, to the corresponding pre-vesting stations.

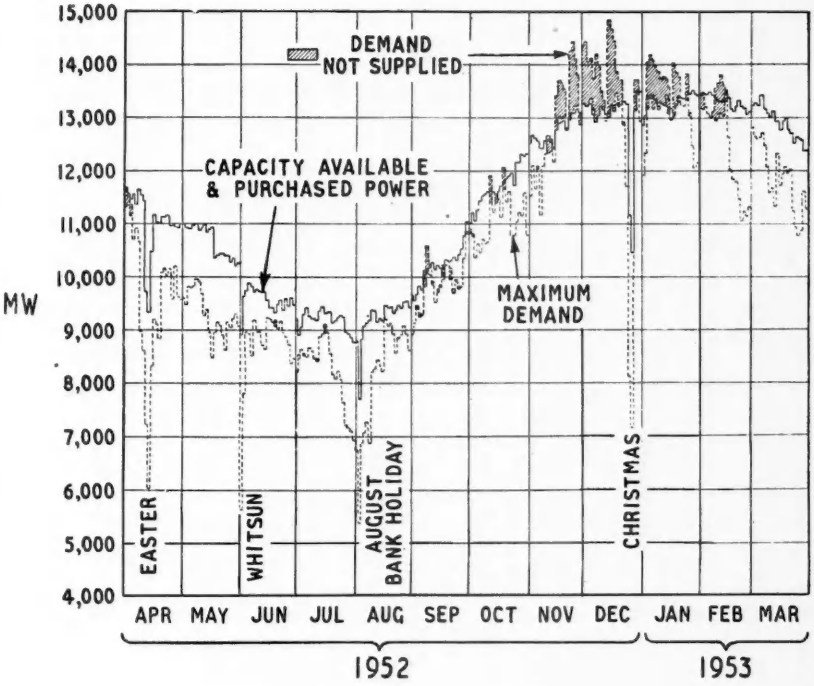
expected. Preliminary investigations were carried out in regard to pumped storage schemes and to the supply of steam for district and industrial heating.

THE GRID

At the close of the period under review the grid comprised 4,682 route miles of main transmission and interconnecting lines, of which 4,174 miles (including 67 miles of underground cable) were at 132 kV. Transformer capacity was 18,939 MVA in 299 grid substations. There were 516 system faults compared with 374 in 1951–52; 90 per cent were cleared correctly in both years.

Major transmission works put in hand during the year included 203 route miles at 132 kV and 372 miles at 275 kV. The value of contracts placed was £21·1 million of which £9·6 million was in respect of the 275 kV supergrid, 41 miles of which, between Staythorpe (Newark) and West Melton (Sheffield) were in operation throughout the year at 132 kV. Arrangements were made with five manufacturers to install short lengths of 275 kV oil-filled and gas-pressure cable, together with joints and outdoor sealing ends, at a temporary testing station near Staythorpe power station. The separate lengths are to be connected in series with one phase of the Staythorpe–West Melton line.

Production prototypes of 275 kV circuit breakers are approaching completion. Two further 132 kV indoor switch stations, bringing the total to four (the first in this country) have been brought into use. The first two of forty-two 120 MVA 275/132 kV



PLANT CAPACITY AND SYSTEM DEMAND

The shaded areas show the demand which could not be supplied, i.e., the estimated amounts of load reduction due to lowered frequency and load shedding by voltage reduction or disconnection

auto-transformers ordered for the first stage of the supergrid have been installed.

Twelve further points of bulk supply to Areas from the grid have been agreed upon, thus saving about £1·7 million more, as compared with the cost of developing existing supply points.

The maximum potential demand, 14,850 MW, occurred on 15th December; this demand was 1,549 MW in excess of the output capacity available and in extremely cold weather and without load spreading would have been 2,400 MW. The average loss of capacity due to breakdowns and other causes during December and January was 13·6 per cent. The annual load factor based on maximum demand met was 49·2 per cent, compared with 51 in 1951–52, and that based on maximum potential demand (i.e., after allowing for load reduction by lowered frequency and voltage and by cutting off consumers) was 44·9 per cent as against 47·4 per cent. Power cuts numbered nine (79 in 1951–52 and 101 in 1950–51).

AREA BOARDS' SALES

The sales of the Area Boards to their consumers rose by 3·7 per cent to a total of 52,264 million kWh and Table II shows the division of the sales among the various classes of consumers. The increase of 3·7 per cent compares with 12·3 per cent in 1950–51 and 8·2 per cent in 1951–52. Table III analyses the figures by Boards.

Table II.—Consumers and Sales

Class	Number of consumers 31.3.53	Per cent inc. or decrease on 1951–52	Sales of electricity 1952–53 (million kWh)	Per cent inc. or decrease on 1951–52
Industrial	157,713	+2·7	25,879	+2·5
Commercial	1,385,159	+2·1	7,554	+11·8
Farm	134,429	+8·6	674	+18·2
Domestic	12,203,284	+3·3	16,260	+1·7
Traction	70	−4·1		
Rail	—	—	933	+2·1
Street	—	—	467	−5·8
Public lighting	4,105	−0·4	497	+9·0
Totals	13,884,760	+3·2	52,264	+3·7

The number of consumers connected was about 435,000 or slightly more than in the previous year. It is noteworthy that farm consumers showed the greatest proportional increase (8·6 per cent); domestic consumers rose by 3·3 per cent and the industrial class by only 2·7 per cent. The sales of electricity to the last two classes were affected by the slowing down of industrial production and domestic sales were further depressed by hire-purchase restrictions. The decline in electric street traction was indicated by a fall in sales of 5·8 per cent, only partly compensated by a rise in railway traction sales, due to the increased requirements of the Manchester–Sheffield electrification.

Load factors of the bulk supplies to Area Boards ranged from 41 in the case of

Table III.—Analysis of Electricity Board's Sales

Board	Population (thousands)	Number of Consumers (thousands)	Sales of Electricity (thousands of kWh)						
			Domestic	Farm	Commercial	Industrial	Public lighting	Traction	Total (excluding inter-Board sales)
London ..	5,124	1,646	1,981,859	397	1,452,928	1,272,837	91,795	86,889	4,886,705
S. Eastern ..	3,236	1,017	1,462,336	51,241	481,215	796,947	33,514	19,949	2,845,202†
Southern ..	3,794	1,072	1,390,924	90,495	707,539	1,146,213	27,637	16,876	3,379,684
S. Western ..	2,124	626	701,468	46,782	310,258	507,254	17,504	—	1,583,266
Eastern ..	4,801	1,421	1,988,742	95,932	615,350	1,706,948	37,831	134,295	4,650,983
E. Midlands ..	3,668	1,082	1,233,481	72,785	475,661	2,172,815	28,523	25,216	4,008,481
Midlands ..	4,117	1,158	1,468,396	75,844	625,691*	3,227,983	30,627	27,614	5,524,786†
S. Wales ..	1,980	506	427,796	13,952	207,579	2,490,232	19,306	9,368	3,168,233
Merseyside and N. Wales ..	2,840	756	858,432	36,647	393,944	1,620,700	25,487	73,234	3,051,869†
Yorkshire ..	4,169	1,270	1,317,945	32,082	511,153	3,436,341	39,269	127,162	5,463,952
N. Eastern ..	2,971	782	661,766	23,798	324,734	2,077,234	22,352	65,120	3,175,004
N. Western ..	4,563	1,435	1,541,526	69,265	582,860	3,404,292	53,567	56,611	5,851,986†
S.E. Scotland ..	1,337	369	356,376	19,211	195,054	503,768	17,636	31,546	1,123,591
S.W. Scotland	2,572	745	810,129	45,150	401,641	1,476,859	51,728	—	2,785,507
Totals ..	47,296	13,885	16,201,176	673,581	7,285,807	25,840,423	496,776	673,880	51,499,249†

* Including small industrial supplies.

† Including combined domestic and commercial: Eastern 71,685,000; Midlands 68,631,000; Merseyside and N. Wales 43,425,000; N. Western 143,865,000; total 327,606,000.

London to as much as 62 in the case of South Wales. Retail tariffs are kept under constant review to encourage off-peak loads. An extensive load has already been built up by providing supplies controlled by time switches, etc., under special agreements and in some cases under published tariffs and the Boards are considering the extension of such arrangements in standard form to further types of consumption.

The number of farms connected was 10,584, raising the total to 134,429, and the average consumption rose from 4,747 to 5,011 kWh. Much is being done to encourage the greater use of electricity by farmers.

A summary of the Ridley Committee's recommendations is given in the report with the comments of the Central Authority and the Boards.

Either directly or through their membership of B.S.I. and E.D.A. Committees the Authority and Boards have assisted in preparing (*a*) British Standards for electrode boilers, fireguards for heating appliances, requirements for electrical appliances and accessories, limits of radio interference, bayonet lamp caps, lampholders and lampholder plugs and tubular fluorescent lamps; (*b*) a revised Standard for fuses up to 660 V; (*c*) a standard code of practice for street lighting on traffic routes; and (*d*) draft Standards for cord-operated ceiling switches, wash-boilers and performance of and methods of testing boiling plates. The Joint Domestic Cooker Committee continued its work on cooker design and standardization.

A new heading, " Consumer Service," in the annual accounts facilitated a review of the existing apportionment of costs covering management, consumer service and contracting and sales of fittings. Further discussions took place with the contractors' associations. The Organizing Committee set up to arrange the establishment of a National Inspection Council circulated its report, but submissions made by two of the organizations represented on the Committee embodied fundamental changes in the proposed character and functions of the Council and progress was halted until that difficulty was resolved.

Utilization research has covered the conclusion of field tests on the characteristics of the domestic cooking load on which a report is being prepared. Tests on domestic water heaters were continued and an interim report on three samples recorded the excellent characteristics of the immersion heater. Tests were also conducted on two sink water heaters and associated cookers, with change-over switches and independent switch control for comparison purposes. Preparations were made for comparative trials of electric and gas under-draining-board water heaters. Plans were completed to carry out tests in 90 houses to be erected by the Authority for the staff of a new power station in Yorkshire. Other load analysing tests were in hand.

FINANCIAL RESULTS

The consolidated net surplus for the year of the Central Authority and Area Boards was £7·28 million. To this is added £5·01 million brought forward and after other adjustments there is an available balance of £12·68 million, disposed of as follows:—To taxation reserve £5·11 million; to central reserve fund £2·00 million; carried forward £5·57 million. The past year's net surplus was made up of £5·82 million from the Central Authority and £1·46 million from the Boards.

Of an aggregate net surplus of £28·33 million for the first five years of operation

View of the turbine hall at Brighton " B " generating station

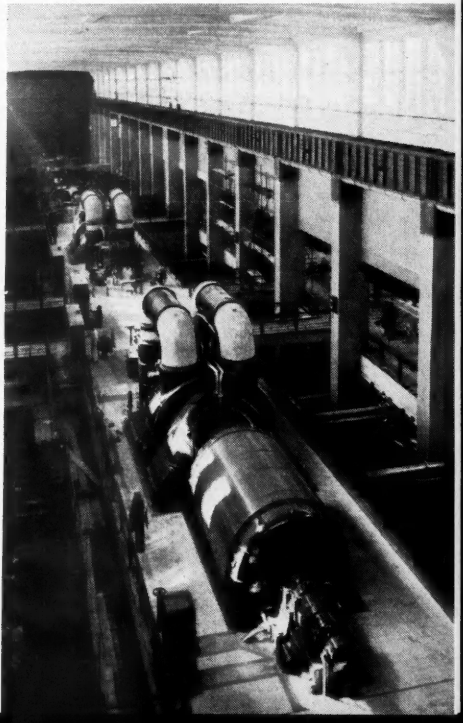


Table IV.—Area Boards' Revenue and Expenditure

Board	Total Income		Total Expenditure		Net Surplus or Deficit	
	1951-52	1952-53	1951-52	1952-53	1951-52	1952-53
	£	£	£	£	£	£
London	32,591,520	36,802,344	32,092,722	35,336,937	498,798	1,465,407
South Eastern	17,211,571	19,455,934	17,308,645	19,280,532	— 97,074	175,402
Southern	19,663,364	22,038,322	19,596,649	21,931,991	66,715	106,331
South Western	9,523,164	10,854,462	9,664,973	11,003,429	— 141,809	— 148,967
Eastern	26,339,297	28,773,667	26,211,131	29,185,659	128,166	— 411,992
East Midlands	18,409,001	20,819,853	19,234,784	21,130,776	— 825,783	— 310,923
Midlands	25,418,407	27,502,985	26,079,141	28,144,588	— 660,734	— 641,603
South Wales	12,294,228	13,696,243	11,970,102	13,339,898	324,126	356,354
Merseyside and N. Wales ..	15,731,356	16,585,705	15,626,539	16,389,038	104,817	196,667
Yorkshire	22,840,945	24,933,957	23,037,414	25,047,256	— 196,469	— 113,299
North Eastern	14,828,935	16,297,304	14,991,182	16,263,567	— 162,247	33,737
North Western	29,283,806	31,358,860	29,059,418	30,687,461	224,388	671,399
S.E. Scotland	5,476,078	6,240,625	5,589,708	6,061,875	— 113,630	178,750
S.W. Scotland	12,625,959	14,364,829	13,108,026	14,465,712	— 482,067	— 100,883
Totals (excluding inter-Board bulk supplies)	261,150,581	288,653,086	262,483,384	287,196,715	—1,332,803	1,456,371

£7·10 million is held in the central reserve fund, £4·75 million in the Area reserve funds, and £5·57 million is carried forward; £10·91 million has been reserved for taxation.

The Central Authority's own accounts show a total income of £190·88 million (including £0·52 million from the sale of steam) (0·7839d per kWh sent out) and total works costs of £177·72 million (including generation £168·99 million and purchase of electricity £2·12 million) (0·7299d/kWh), leaving a gross surplus of £13·16 million which is reduced to £5·82 million net by administration and general expenses (£2·43 million) and other expenses, including training, safety and welfare, research and unallocated capital charges (£4·91 million). It is noted that the increase of 3s per kW in the demand charge of the bulk supply tariff yielded the Authority an extra £2·07 million; fuel cost adjustments added £7·09 million.

Table IV summarizes the accounts of the fourteen Area Boards; from this it will be seen that last year only six of the Boards incurred deficits whereas eight of them had adverse balances in 1951–52.

Sales of electricity by the Area Boards brought them a revenue of £282·46 million (against £253·64 million in 1951–52). Their purchases of electricity cost them £187·83 million (against £170·21 million) leaving a gross surplus of £94·63 million (£83·43 million). Other expenses reduced this to £1·46 million (in 1951–52 there was a deficit of £1·33 million.

Average income per kWh rose from 1·220d to 1·311d; the figure ranged from 1·028d in South Wales to 1·744d in London. The revenue per kWh from the various classes of consumers was as follows:—Domestic 1·452d (against 1·353d); farms 1·397d (1·339d); commercial 1·829d (1·760d); combined domestic and commercial 1·552d (1·557d); industrial 1·088d (1·002d); public lighting 1·337d (1·269d); traction 1·016d (0·977d).

Lower revenue was earned by the Boards as a whole in contracting and sales of "fittings" (see Table V). Cash and credit sales amounted to £18·17 million (against £18·30 million in 1951–52) and hire-purchase and similar sales to £8·14 million (£10·67 million), making a total of £26·30 million (£28·97 million). Only the London Board recorded an increase (£2·76 million against £2·64 million). Six of the Boards showed deficits on this account; all of them made a net profit in 1951–52. While the percentage of direct costs to total sales fell from 81·7 to 81·4, indirect costs rose from 15·6 to 19·2 per cent. The report says:—"In the short term, indirect costs do not readily respond to reduced activity in the business of contracting and sales of fittings."

The consolidated balance sheet of the Authority and Boards as at 31st March last show written down fixed assets valued at £839·97 million; interests in subsidiary companies and investments £26·93 million; obligations to local authorities £1·43 million; compensation for undertakings vested in the North of Scotland Hydro-Electric Board £8·47 million; current assets £142·34 million; and intangible assets £44·16 million. The total capital liabilities are £863·82 million (including £741·14 million of British Electricity Stock); reserves £28·33 million; and

current liabilities and provisions £171·14 million (including temporary bank advances £92·34 million).

At 31st March last the Authority employed 49,091 people and the Area Boards 132,272—a total of 181,363 of whom 11·6 per cent were women. Nearly 68 per cent were manual employees and the remainder were in the engineering, administrative and clerical grades. The total increased by only 1·3 per cent whereas electricity output rose by 9·3 per cent, sales by 3·7 per cent and the number of consumers by 3·2 per cent. The report contains a record of employment and staff relations during the year.

MINISTER'S REPORT

The statutory report of the Minister of Fuel and Power for the year ended 31st March last shows that the Minister issued consents for the extension of 19 stations and one for the construction of a third section for the Hams Hall (Birmingham) group. The consents covered an aggregate installed capacity of 580,780 kW, including the installation of 32 diesel sets, in 14 small stations, with a total capacity of 50,780 kW.

A total of 7,862 consents were given to the placing of overhead lines. In 13 cases (including three outstanding from the previous year) the local authority or planning authority concerned was given a hearing and in two further cases public inquiries were held. In these cases consents were issued in eight cases, five were refused and two remained outstanding at the end of the year. Consents were given in 56 cases for the placing of lines across private land; eight applications were withdrawn and a further 56 were still under consideration.

Under the Electricity Supply Regulations, 1937, the Minister (with the concurrence of the Postmaster-General) approved in 66 cases the adoption of protective multiple earthing in connection with medium- and low-voltage systems originating at specified substations with pole-mounted transformers. Approvals were given in three cases to the multiple earthing of h.v. systems and in two cases to the interconnection of earthed h.v. systems.

The Minister made two special regulations permitting the South Western and Eastern Electricity Boards to insert inductive resistances at certain points in their h.v. systems. Consents to 38 changes in systems of supply were issued during the year.

Accident reports made to the Minister show that 33 persons (including 17 members of the public) were killed and 292 (75 members of the public) injured in accidents in connection with the systems of Electricity Boards. Of these, 39 accidents (12 fatal) were caused by mobile elevators, cranes, etc., touching overhead lines; seven (one fatal) were due to members of the public climbing overhead line supports; 16 were accidents to workmen who pierced underground cables during excavations; and 28 manhole and roadway explosions resulted in injury to two persons. In addition 48 fatal accidents to consumers in their own premises were reported.

The Minister continued to allow in

Table V.—Electrical Contracting and Sales of Fittings

Board	Sales		Direct Costs		Indirect Costs		Surplus	
	1951–52	1952–53	1951–52	1952–53	1951–52	1952–53	1951–52	1952–53
	£	£	£	£	£	£	£	£
London	2,642,336	2,764,111	2,173,099	2,269,057	347,903	480,912	121,334	14,142
South Eastern ..	2,058,857	1,924,312	1,639,974	1,503,746	396,751	411,640	22,132	8,926
Southern	2,739,769	2,493,538	2,220,767	2,014,544	492,710	469,581	26,292	9,413
South Western ..	1,679,819	1,613,620	1,321,280	1,241,208	381,142	407,201	−22,603	34,789
Eastern	4,619,623	4,418,780	3,850,090	3,608,557	681,214	842,099	88,319	31,876
E. Midlands ..	1,445,003	1,344,006	1,169,639	1,098,109	240,381	228,497	34,983	17,400
Midlands	4,479,575	3,683,101	3,626,439	2,992,734	686,139	773,800	166,997	83,433
South Wales ..	899,805	786,322	752,843	650,729	144,906	203,630	2,056	68,037
Merseyside and N. Wales	1,255,171	1,060,184	1,012,221	846,237	220,166	192,923	22,784	21,024
Yorkshire	2,340,594	2,150,715	1,926,295	1,778,018	321,215	362,061	93,084	10,636
North Eastern ..	1,088,338	820,389	935,202	684,273	90,584	112,228	62,552	23,888
North Western ..	2,739,793	2,313,396	2,254,766	1,961,982	346,998	408,075	138,029	56,661
S.E. Scotland ..	494,078	466,684	391,790	365,511	90,957	97,009	11,331	4,164
S.W. Scotland ..	486,927	462,794	401,976	385,273	65,735	62,539	19,216	14,982
Totals ..	28,969,688	26,301,952	23,676,381	21,399,978	4,506,801	5,052,195	786,506	−150,221

appropriate circumstances certain modifications and relaxations in the Overhead Line Regulations and notices were served in 24 cases where lines and works had been established without statutory authority.

Ten electricity meter types were approved and in 15 further cases the meters were held to be covered by previous approvals. Extensions of 33 previous limited-period approvals were granted. In disputes regarding the accuracy of meters, in 15 cases the meters were found to be order and in nine not in order. Two approvals were given to the examination and testing of meters by one Board for another.

The second part of the report details changes in the personnel of the B.E.A., Electricity Boards and Consultative Councils; the capital investment programme (which restricts the annual rate of commissioning of new plant to 1,550,000 kW from 1955 to 1957 and 1,750,000 kW in 1958 and 1959); conditions of employment; education and training; finance; and confirmation of compulsory purchase orders.

Eastern Region Electrification

Extensions from Shenfield to Chelmsford and Southend

BRITISH Railways (Eastern Region) announces that, with the approval of the British Transport Commission, it has been decided to extend the existing Liverpool Street–Shenfield electrification to Chelmsford and to Southend (Victoria). The total cost will be about £2½ million, and work will start as soon as possible. The route lengths involved are 9½ miles from Shenfield to Chelmsford, and 21¼ from Shenfield to Southend, over 30 miles in all.

Faster and more Frequent Trains

It is expected that when this additional electrification is in operation, the standard journey time of the regular-interval electric services from Liverpool Street to Southend will be one hour, with six intermediate stops. There will be faster trains in the morning and evening peak periods. Twenty-two electric trains between Liverpool Street and Shenfield will be extended to Chelmsford, thus increasing the present local service by more than half and providing through electric services between Chelmsford and Romford, Ilford and the suburban area generally.

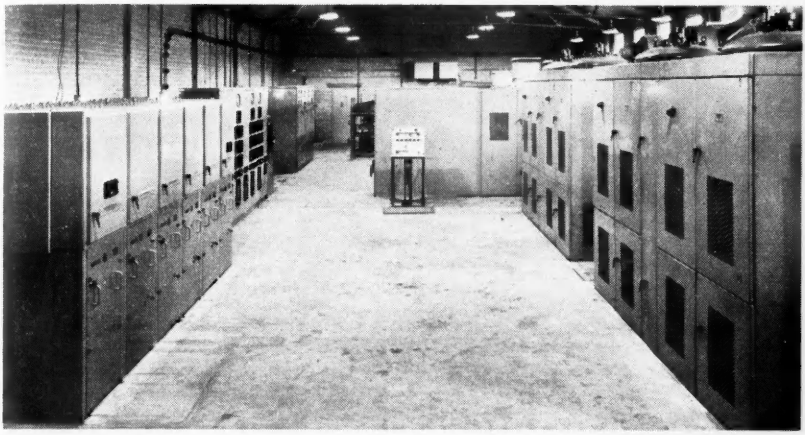
Electric trains for the Southend services will be of a new pattern made up of four-coach all-steel units, each unit providing 373 seats. Of the 354 third-class seats, 145 will be in open-type vehicles with centre passageway and the remainder in compartment type coaches. Doors will be provided for each compartment and each bay of the open stock.

The decision to electrify these lines forms an integral part of the general programme of improving railway facilities between London and the Essex residential areas. British Railways emphasize that the extension of the existing Liverpool Street–Shenfield electric services forms an essential and preliminary step to the larger scheme of electrification from Fenchurch Street to Tilbury and Southend (Central). Technical planning for this larger electrification is now well in hand, but exceptionally important engineering works will first have to be completed on the Fenchurch Street line, including the reconstruction of Barking station, the rearrangement of tracks with a "fly-over," and the construction of a large new marshalling yard. These will take some years to complete.

On the other hand, the extension of electrification from Shenfield to Chelmsford and Southend is a straightforward scheme, with no major engineering works, which it is hoped can be finished by January, 1957. Fast electric services should, therefore, be already running on the Southend–Liverpool Street route by the time the big engineering works on the Fenchurch Street line begin to cause some delays on that route; the reserve capacity of the electrified Liverpool Street line will then be of considerable benefit to Southend travellers.

New Traction Substation

London Transport Modernization Scheme



Division of the plant into accessible and transportable units is the essential feature of the substation

ON Tuesday last week Lord Latham, just before his retirement from the position of chairman, London Transport Executive, officially opened a new substation at Surrey Docks, on the London Transport electricity distribution system. Replacing a rotary substation which was bombed during the war and being the first installation to be completed under the current programme for modernizing the distribution system, the new substation is notable for its simplicity in building and equipment layout; for the introduction of totally-enclosed air-cooled transformers in place of those of the straight-through air-blast type; for the elimination of oil in all but the e.h.v. circuit breakers; and for the adoption of unit construction.

Designed to convert the 11 kV, 3-phase, 50 c/s incoming supply to 660 V, two-wire d.c. for traction purposes, the new substation is to be normally unattended and remotely controlled from Aldgate.

The h.v. a.c. circuits are controlled by an 11 kV double busbar metalclad switchboard with six circuit breaker units, one for each of the two incoming feeders, one for each of the feeders to the three rectifier equipments, and one for the supply to the lighting transformer. Each unit is totally enclosed by sheet steel covers and is fitted with a 400 A oil circuit breaker of 350 MVA rupturing capacity. The circuit breakers are arranged for vertical isolation and are mounted, together with their closing mechanisms, on carriages which may be completely withdrawn from their housings for inspection and maintenance purposes. The circuit breakers are normally solenoid-operated, but there is provision also for their manual operation.

The rectifier circuit breakers are fitted with quick-acting overload trip coils set to operate instantaneously at five to six times normal full load. Associated with the main a.c. switchgear is a seven-cubicle relay board serving the incoming, rectifier and lighting feeders, and this board is fitted with flash type protective and control relays and rectifier ammeters. Each of the three

1,000 kW, 660 V, steel tank rectifier equipments, of the G.E.C. pumpless air cooled design, has two 500 kW, 6-anode cylinders together with their transformers, and each pair of cylinders normally operates as a 12-phase unit. The rectifiers are of the draw-out type and each cylinder is mounted on the top plate of a wheeled truck above its auxiliaries. The six complete truck-mounted units are interchangeable.

Each rectifier cylinder has its own 500 kW 11,000/593 V (phase to neutral) supply transformer. These transformers are of the air-blast cooled, closed air circuit type, and each one is installed at the back of the associated rectifier unit, so that the end of the transformer case forms the rear wall of the rectifier cubicle.

One transformer in each 1,000 kW bank has a star-connected and the other a delta-connected primary winding, so that there is a phase displacement of 30 deg between the outputs of the two units. The secondary in each case is connected in double star through a 150 c/s inter-phase transformer in order to give the necessary 6-phase output, and to effect the 12-phase working the two units are interconnected through a 300 c/s inter-phase transformer. Rectifier ignition and fan motor supplies are provided from 242 V tertiary windings on the supply transformers. A Serck air/air heat exchanger cooling unit is mounted on top of each transformer housing.

Each rectifier cylinder is mounted on the top plate of a wheeled truck above its auxiliaries

The whole of the d.c. switchgear is assembled to form two nine-panel, truck cubicle switchboards which are installed back to back with a gangway between. One board houses the positive high speed circuit breakers and busbar selector units, while the other contains the equivalent negative switchgear.

The 660 V d.c. busbars are divided into three sections interconnected by 3,000 A busbar selector contactors of the Salford line contact type. Each section is fed from one 1,000 kW rectifier equipment, the positive connections being made through 3,000 A reverse current high speed circuit breakers, while the negative contactors are of the line contact type. Two track feeders are taken from each of the two outer busbar sections, the positive feeders being controlled by overload high speed circuit breakers and the negative feeders by contactors of the line contact type. In each circuit the positive breaker and negative contactor are electrically coupled so that they close and open in sequence. Surge divertors are fitted to the outer sections of each busbar.

The substation auxiliary supplies are controlled from a combined a.c. and d.c. switchboard fed from the 300 kVA, 11,000/415/240 V oil-immersed lighting transformer.

The rectifiers are started automatically by closing the associated oil circuit breakers to energize the transformers, ignition of the two cylinders in each equipment taking place simultaneously. A sequence contactor is energized through auxiliary anode load relays as soon as both cylinders have ignited, and auxiliary contactors then operate to close first the high speed circuit breaker and next the negative contactor to connect the equipment to the d.c. busbars. The track feeder and busbar selector circuit breakers are electrically operated by means of 660 V closing and tripping contactors. Busbar/track selector contactors are provided so that the feeder breakers can be closed when the d.c. busbars are dead.

The track feeder circuit breakers trip automatically at overcurrents dependent upon the settings of calibrating resistors mounted on the high speed circuit breaker trucks, the settings being variable between

5,000 and 6,000 A by means of six-way stud switches. The General Electric Co., Ltd., supplied the whole of the substation plant.

In his inaugural speech Lord Latham stressed the simplicity of the new substation with regard to both the building and the unit layout of the plant. The building contained 10 per cent of the steel and 60 per cent of the bricks and cement used in a substation of equal output built before the war, while the division of the plant into easily accessible and transportable units allowed for its accommodation on almost any site—long and narrow like the present one or in the confined space of a disused lift shaft.

He congratulated Mr. T. S. Pick, B.Sc. (Eng.), M.I.E.E., chief electrical engineer, London Transport, on the ingenuity of the design of the substation, and he welcomed Sir Harry Railing, chairman of the General Electric Co., Ltd., and congratulated him and his company on the way they had carried out their work.

Rugby Engineering Society's Jubilee

Technical Progress Demonstrated

TO commemorate the jubilee of the Rugby Engineering Society an exhibition illustrating technical progress since its formation was held on 24th and 25th September at the Rugby College of Technology and Arts. The nature and magnitude of the contributions made by engineering firms in that town in research and in production technique, as well as in final results, were well illustrated by actual examples or by photographs, diagrams and models of larger work.

The formation of the Society coincided with the manufacture of the earliest steam turbines to be built in Rugby. These were units of a few hundred kilowatts designed for steam conditions of 150 lb/sq in and 400 deg F, compared with modern sets of 100 MW and over, multi-cylinder impulse-reaction types running at 3,000 r.p.m. and operating at 1,500 lb/sq in and 1,050 deg F. Historical exhibits included a Willans engine, the original impact testing machine of Izod (a Rugby engineer) and a 500 h.p. 25,000 r.p.m., 1,500 lb/sq in turbine made in 1923 for use in connection with a Benson boiler. A further high temperature development (1929) was a steam turbine operating at 1,000 deg F.

More modern exhibits were a complete jet engine and a jet engine rotor, a sequence of the completion in 1937 of the first jet engine based on Whittle's proposals. A model of the first marine gas turbine in commercial service (in the tanker *Auris*) was shown with refractory lined combustion chamber. The now widely used louvre combustion chamber (first developed in Rugby) in which inward flowing cooling air shields the inner surface from a combustion gas temperature of up to 3,500 deg F exemplified another component. Particulars given of land gas turbines built locally included the first British machine for a power station overseas (East Africa) and two 20 MW units (the highest rating yet designed in this country) of the high ratio type with two-stage compression and a separate power turbine for the 3,000 r.p.m. alternator. Among the oil engines shown was one of 372 b.h.p. for industrial duty.

Water turbines and alternators have advanced in output since 1920 from 3·5 to 67,000 kVA. A model was shown of the 28,000 h.p. Kaplan turbine with high part-load efficiency built for the Invergarry station of the North of Scotland Hydro-Electric Board to operate under a head of 178ft. Other models represented a 44,000 h.p. Pelton impulse turbine and a "Straightflow" rotary or smooth bore valve, of which the largest in the world, measuring 11ft and weighing 160 tons, were supplied to Portugal.

Developments in conversion from a.c. to d.c. and vice versa were traced in a series of photographs leading up to a 39,000 kW installation of modern 3,240 kW motor convertors and an 18,000 kW installation of 450 kW pumpless steel-tank rectifiers. Electric motor manufacture started in Rugby the year before the foundation of the Society and the exhibits illustrated the

trend from the mere substitution of motors for steam engines driving line shafting to co-ordinated individual drives and small special purpose machines. The effect of modern electric drives was exemplified by numerous photographs, one series showing how output per man-hour of tinplate had increased fifty-fold during the past twenty years with greatly improved quality. Working models of a drag-line for surface mining, capable of handling 20 cu yd of material at a 260ft radius, and of a diesel-electric tug were prominent in this section.

The inception of electronics coincided with the birth of the Society and the work of the late R. C. Clinker led to his making the first triode valve in England, an example of which was included in the chronological series in this sphere, which embraced radio, films, cathode ray tubes and recent applications of electronics to industrial control systems and computing machines. The historical range of lamps indicated the continuous research into light production. A novel, though at present rather inefficient, electro-luminescent lamp was on view.

Despite the great historical interest of a large proportion of the exhibits, their greatest merit lay in acting as pointers to the future. This was especially notable in the sections devoted to magnetic materials, insulation and measurements.

The exhibition was very well attended, as was the conversazione on Thursday, when members and guests were received by the president, Mr. A. W. C. Hirst, and Mrs. Hirst. In a short address, Mr. Hirst thanked the Governors of the College of Technology for their hospitality and referred to the presence of the Principal (Mr. W. Cooper, a past-president of the Society). He was one of the 13 out of 46 holders of the office who were, he said, able to take part in the jubilee, the number including Sir William Larke (the first of the line) and Sir Arnold Gridley, M.P. There were also present the Mayor and Mayoress of Rugby, representatives of the senior engineering institutions, the technical Press, British Railways and other public authorities. Sir William Larke and the Mayor briefly responded.

World Power Conference

THE annual meeting of the International Executive Council of the World Power Conference took place in Western Germany last month. The first session was held at Essen on 7th September and the second session at Düsseldorf on the 8th. Sir Vincent de Ferranti, chairman of the British National Committee and of the International Executive Council, was prevented by indisposition from presiding. In his absence the chair was taken by Mr. Gail A. Hathaway, chairman of the United States National Committee and one of the vice-chairmen of the International Executive Council. The United Kingdom delegates were Sir John Hacking, vice-chairman of the British National Committee; Dr. A. Parker, C.B.E., hon. secretary of the British National Committee; and Mr. B. L. Metcalf, chief electrical and mechanical engineer, National Coal Board. Mr. C. H. Gray, secretary of the Council, was also present.

The delegates, from seventeen countries, were entertained to luncheon by the National Committee for the German Federal Republic on 7th and again on 8th September and there was also a full programme of technical visits, and a special programme for the ladies attending with delegates.

The following were among the matters discussed: Invitations for the Fifth World Power Conference, to be held in 1956; the sectional meeting of the World Power Conference to be held in Rio de Janeiro from 25th July to 8th August, 1954; future conferences; relationships with the United Nations and with UNESCO; and the meeting of the International Executive Council in 1954.

The annual executive meeting of the International Commission on Large Dams of the World Power Conference was held in Paris on 11th September. Mr. Gail A. Hathaway (United States), chairman of the Commission, presided and the British delegate was Sir William Halcrow who is one of the vice-chairmen of the Commission.

The fifth Congress of the International Commission on Large Dams will be held in Paris in 1955.

We have received a copy of the annual report of the World Power Conference for 1952, copies of which can be obtained from the offices of the British National Committee, World Power Conference, 201–2, Grand Buildings, Trafalgar Square, London, W.C.2 (price 1s 6d), and of a new edition of a leaflet giving information about the past history and current activities of the World Power Conference, together with a list of publications, which can be obtained free from the same address.

VIEWS on the NEWS

By REFLECTOR

REFERENCE has been made in these notes from time to time of complaints that Scottish power was being sent over the border. It seems as though the balance may be redressed during the coming winter. The chairman of the Scottish Board for Industry said recently that the peak demand was likely to exceed plant capacity by 156,000 kW. Although voluntary reduction of demand in peak hours, coupled with voltage and frequency reduction, would reduce the gap, that gap could be closed only by relying on 40,000 kW from England—if England was in a position to supply it. I sincerely hope that if Scotland is in need we shall be able to go to her rescue.

* * *

According to the *Star* the South Eastern Gas Consultative Council is again pressing complaints that new council house tenants are having electricity forced on them, while the London Electricity Consultative Council has been told of hire-purchase buyers of electrical equipment being compelled to change to gas in their new homes. The Gas Consultative Council has passed a resolution deploring the action of local authorities in establishing all-electric estates. I do not deplore such action while some other authorities refuse to provide proper electrical facilities for their tenants. Although the duplication of services is undesirable (and people *must* have electricity) it is better to duplicate if necessary than to be accused of unfair discrimination.

* * *

I am told that some confusion has been caused by a statement in the current *Radio Times* that upon the coming into force of the Heating Appliances (Fireguards) Act on 1st October "no gas, electric or oil heaters may be sold or let for hire unless they have guards complying with certain prescribed standards." This is not strictly accurate. While it applies to new fires, the regulations permit the sale or hire of any heaters without guards made before 1st October until the end of September next year.

* * *

At a recent meeting in Montreal Mr. H. H. Rogge, president of the Canadian Westinghouse Co., said that "Canadians have 1,900,000,000 enerjoes, probably more per capita than any other country." I am pleased to say that Mr. Rogge went on to explain that "the enerjoe is the newest unit of power recently worked out by Canadian electrical engineers to establish the annual output of physical energy by an average working man for a year." I still haven't got it quite clear. What are the bases and why the "joe"?

* * *

The decision of the Ministry of Works to discontinue the floodlighting of London's public buildings last Saturday is lamentable. Just as it is beginning to look miserable again the world's leading city (I suppose it still is) has to be deprived of a feature which is not only attractive but heartening. A somewhat ludicrous concession is the illumination of the Trafalgar Square fountains on two nights a week. I suppose we must rely on private enterprise to alleviate our metropolitan gloom.

* * *

Strange event recorded in the New York *Electrical World*:—

> "A local R.E.A. line crew went out recently to track down a short circuit that knocked out power to six farms and discovered that the trouble was atop a 35ft pole. It was a full-grown jackrabbit whose body had shorted the wires."

This jackrabbit reminds me of Mark Twain's jumping frog of Calaveras County, another remarkable example of American fauna.

I.E.E. CENTRE CHAIRMEN

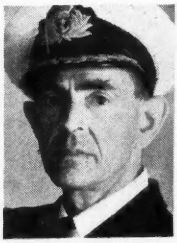
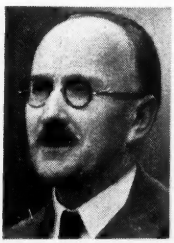
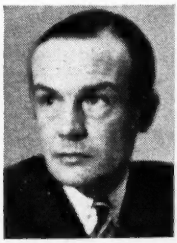
Officers Elected to Serve for the 1953–54 *Session*

MANY of the provincial Centres of the Institution of Electrical Engineers will be commencing their programme of meetings for the 1953–54 Session next week. We published last week biographical notes of some of the chairmen, and we now give below brief notes of the chairmen of the remaining Centres.

MR. J. VAUGHAN HARRIES (Western Centre), who is district manager at Cardiff for the Brush Electrical Engineering Co., Ltd., commenced work at the early age of thirteen at the Deep Navigation Collieries, then owned by the Ocean Coal Co., Ltd. At the age of seventeen he entered the Engineering Department, and during the 1914–18 war served with the 18th Hussars and the Royal Tank Corps. After the war he became a colliery electrician at the Deep Navigation Collieries, and also gained experience during the building of the Treharris power station. In 1928 he was appointed chief electrician of Lady Windsor Collieries. He joined the South Wales Electrical Power Distribution Co. in 1931 as an electrical engineer in the Frequency Change Department and was later transferred to the Commercial Department of the South Wales Electric Power Co., dealing in particular with contracts covering supplies in bulk. He was appointed to his present position with the Brush Co. in 1945. He has been an active member of the Association of Mining Electrical and Mechanical Engineers for many years, and is the president of the Association for 1953–54. Mr. Harries is a member of the Welsh Joint Education Committee and a vice-president of the University College of South Wales and Monmouthshire Engineering Students' Society.

COMMANDER (L) C. V. ROBINSON, O.B.E., R.N. (Southern Centre), is the only son of the late Admiral C. G. Robinson, C.V.O., who was one of the first course of naval officers to qualify in torpedo and electrics in 1874 and subsequently commanded both the *Vernon* and *Defiance* Torpedo and Electrical Schools. Commander Robinson joined the Royal Naval College, Osborne, in 1913 and went to sea in 1916 serving as a midshipman at the Battle of Jutland. After the 1914–18 war he was one of the naval officers who took a course at Trinity Hall, Cambridge, and he obtained all first-class certificates in the examinations for lieutenant. He qualified as a signal specialist with a first-class certificate after the long course at H.M. Signal School in 1923 and completed the advanced wireless course at R.N. College, Greenwich, in 1924. He subsequently served for thirteen years on the experimental staff of H.M. Signal School and at A.S.R.E., Haslemere. From 1925 to 1928 he was in the distant control section and was responsible for the control equipment in the wireless controlled target ships *Agamemnon* and *Centurion*. He returned to the Signal School in 1930 after a period at sea, and after further service at sea, became technical adviser on ship wireless equipment to the Director of the

Mr. J. Vaughan Harries **Comdr. (L) C. V. Robinson** **Mr. C. H. A. Collyns** **Mr. J. R. W. Murland**

Signal Department in 1933–34. From 1935 to 1938 he was lent to the R.A.F. and was in charge of the wireless equipment of the *Queen Bee* wireless controlled aircraft in the Mediterranean. In 1938 he returned to the Signal School and was one of the first naval officers employed on radar. He formed a new department in 1940 responsible for the testing and tuning of all w/t and radar equipment fitted in H.M. ships and remained in charge throughout the war, until he became deputy captain superintendent of A.S.R.E. in 1947. He retired in 1945 with the rank of commander but continued to serve until he was replaced on the Active List as a commander (L) in the new Electrical Branch. From 1947–49 Commander Robinson was radio adviser to the Director of the Naval Electrical Department and since then he has served in H.M.S. *Collingwood*, the Navy's main electrical school. Although again placed on the retired list in 1950 he completed his fortieth year of service in naval uniform in January this year.

MR. C. D. WILKINSON, A.M.I.Mech.E., (East Midlands) has been engaged in the mining industry for the whole of his career. He was born at Newton Moor, but moved to the East Midlands at an early age. He received his practical training with the Bolsover Colliery Co., and his technical training at University College, Nottingham. He held a number of appointments under the Bolsover Colliery Co. and at the time of nationalization was assistant chief engineer to that company. When the mines were nationalized in 1947 he was appointed assistant chief engineer of the No. 3 (Edwinstowe) Area of the East Midlands Division of the National Coal Board. In 1949 he became chief engineer (mechanical and electrical) of the same Area, a position which he still holds. During the 1914–18 war he served in the Royal Flying Corps and the Royal Engineers.

MR. C. H. A. COLLYNS (Scottish Centre), is manager of the Fife Sub-Area of the South East Scotland Electricity Board. He received his education at the Royal High School, Edinburgh, and the Heriot-Watt College, Edinburgh, of which he is an Associate. After service in the Merchant Service and the R.F.C. in the 1914–18 war, he joined the staff of the Musselburgh & District Electric Light & Traction Co. in 1922, and two years later transferred to the Lothian's Electric Power Co., with which company he served as district engineer, construction engineer and sub-station engineer. At vesting date he took up his present position with the S.E. Scotland Electricity Board. He was chairman of the S.E. Scotland Sub-Centre of the I.E.E. last session. Mr. Collyns is a member of the Association of Mining Electrical and Mechanical Engineers and is vice-president elect of the Fife Branch of the Association for 1953–54.

MR. J. R. W. MURLAND, B.Sc.(Eng.) (Lond.), A.C.G.I., M.Cons.E., M.I.C.E., M.I.Mech.E., M.I.I.A. (North Ireland Centre), is a consulting engineer, practising on his own account in Belfast and Dublin. He was educated at Radley College and the City and Guilds College, London, and served as a student apprentice with the British Thomson-Houston Co., Ltd., Rugby, later becoming an assistant on the staff of that company. He went to Northern Ireland as purchasing officer to the Electricity Board for Northern Ireland, with which authority he subsequently became development officer. Mr. Murland established his own practice in 1947. During the last war he served with the 5th Royal Inniskilling Dragoon Guards, and as a military technical officer at the Fighting Vehicle Proving Establishment, and was demobilized as a Lt.-Colonel in the Regular Army Reserve of Officers. In his consulting practice he has advised on problems connected with power requirements of textile mills and factories and the general engineering requirements of large buildings. He is vice-chairman of the Northern Ireland Association of the Institution of Civil Engineers.

Housecraft Advisers' Conference

So that delegates shall have the opportunity of visiting the Hotel and Catering Exhibition, the E.D.A./E.A.W. Electrical Housecraft Advisers' Conference for 1954 will be held from 26th to 29th January. One session of the Conference will, in fact, be held at Olympia, and will be devoted to a discussion of electricity's share in the commercial catering market. The remainder of the programme is at present provisional, but it is hoped that it will include a cookery demonstration by Marguerite Patten, the television cook, a session on food preservation and refrigeration, and another on electric water heating.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced that **Mr. J. H. Dance,** A.M.I.E.E., has been appointed transmission engineer to the North Eastern Division of the B.E.A. in succession to the late Mr. W. Skipsey. Mr. Dance, who has been senior assistant in the Transmission Department, served his electrical apprenticeship with Priestman Collieries, Ltd., and received his technical training at Rutherford Technical College. He entered the electricity supply industry in 1938 after a period with the Post Office Engineering Department, when he joined the North Eastern Electric Supply Co., Ltd., as an assistant engineer, serving at various major substations and power stations, and later he was engaged for a period on electrical construction work before commencing his connection with the Divisional Transmission Department.

Mr. H. W. Swann, O.B.E., M.I.E.E., whose retirement from the position of H.M. Senior Electrical Inspector of Factories and electrical adviser to the Home Office we reported in our last issue, has now joined the board of Chilton Electric Products, Ltd., and will act as technical adviser and consultant.

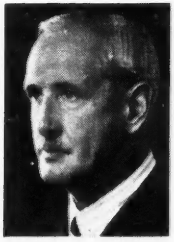
Mr. R. P. Sayers, F.I.E.S., M.S.M.A., Associate I.E.E., sales manager of Ashley Accessories, Ltd., has been appointed to the board. Mr. Sayers, who joined the company in 1951, was previously assistant commercial manager of the Philips' Light Group of Philips Electrical, Ltd.

Mr. R. P. Sayers

Mr. V. C. Ballard has been appointed manager of Simms Motor Units, Ltd., Cardiff branch. Mr. Ballard was formerly a traveller for Simms' Birmingham branch. **Mr. L. W. Blades** has been appointed manager of the central armature rewinding department, which is based at Cardiff.

Mr. H. E. Jackson has resigned from the Council of the Aluminium Development Association following his retirement from the board of Imperial Chemical Industries, Ltd. (Metals Division). His place has been taken by **Dr. Maurice Cook. Mr. G. A. Wooodruff** resigned on retiring from J. Stone & Co., Ltd. He represented L.M.F.A. Development, Ltd., on the Council and his place has been taken by **Mr. J. F. Paige,** of William Mills, Ltd. **Mr. C. W. Cumber,** representing Richard Thomas & Baldwins, Ltd., has resigned on taking up an overseas appointment with his company; his successor has yet to be appointed.

Mr. J. A. Taylor, A.M.I.C.E., A.M.I.E.E., retired from the staff of Pritchett & Gold and E.P.S. Co., Ltd., at the end of September. Educated at Wellingborough School and Faraday House, Mr. Taylor gained his early practical experience with Bruce Peebles & Co., Ltd., of Edinburgh. Before joining Pritchett & Gold in 1919, he had charge of fuze production at five National Ordnance Factories in Leeds from 1916 to 1918. During the period 1923 to 1928 Mr. Taylor visited India, Burma, Ceylon, Australia, New Zealand, South Africa and Egypt on behalf of the company, and since the end of the last war he has twice visited India, Burma and Ceylon.



Mr. J. A. Taylor

Mr. H. Nimmo, C.B.E., M.I.C.E., M.I.E.E., M.I.Mech.E., has been elected president and **Mr. W. Linn,** M.I.C.E., chairman of the General Council of the Engineers' Guild for 1953-54.

C. A. Parsons & Co., Ltd., announce that **Mr. I. Clunas** has been appointed manager of their Bristol office in succession to **Mr. J. Packard** who is now manager at the London office.

Mr. E. G. Ball, deputy power station superintendent at Meaford power station, has been appointed superintendent of the Barugh, Barnsley and Wakefield power stations, B.E.A. Yorkshire Division. He takes up his new duties on 19th October.

Mr. Dermot W. Kent, B.A., A.C.A., is resigning from the board of the Igranic Electric Co., Ltd., from 5th October to take

up the position of commercial director of the associated company, Sentinel (Shrewsbury), Ltd.

Sir John Hacking, M.I.E.E., A.M.Amer.I.E.E., deputy chairman (operations), British Electricity Authority, has accepted an invitation to be president of the Junior Institution of Engineers for 1953-54. He will be inducted as president by Air Commodore F. R. Banks, C.B., O.B.E., M.I.Mech.E., the retiring president, on 11th December at the Royal Society of Arts.

Sir John Hacking

The Council of the Junior Institution of Engineers has made a number of awards in respect of papers and lectures delivered during the 1952-53 session. These include the Institution Prize to **Mr. W. C. C. Ball** for his paper on "Some Problems in the Design of Motion Picture Sound Equipment," and the Tookey Award to **Col. H. S. Walter** for his paper on "Whole House Heating."

The annual dinner of the **Plymouth Electric Club** was held on 23rd September. The speakers were the Earl of Mount Edgcumbe (president), the Deputy Lord Mayor of Plymouth (Mr. L. F. Paul), Mr. P. J. Heath (immediate past-chairman) and Mr. H. Foster.

Sir George H. Nelson, chairman of the English Electric group of companies of which Marconi's Wireless Telegraph Co., Ltd., and the Marconi International Marine Communication Co., Ltd., are members, was host to some 800 guests at a dinner and dance at the Dorchester Hotel, London, on 22nd September, in honour of delegates who are in London from all parts of the world for the Seventh Plenary Assembly of the **International Radio Consultative Committee** (C.C.I.R.). The dinner was followed by a cabaret which was televised throughout Britain by the B.B.C. using Marconi cameras and equipment.

The Council of the Institute of Metal Finishing has awarded the Westinghouse Brake & Signal Co.'s prize for the 1952-53 session to **Messrs. A. E. Davies, R. M. Angles** and **J. W. Cuthbertson**, joint authors of a paper on "Complex Fluorides for the Deposition of Tin and Tin Alloys," presented during the annual conference held in April. The award will be made at the annual dinner of the Institute at the Charing Cross Hotel, London, W.C.2, on 13th October.

British Insulated Callender's Cables, Ltd., on 18th September, entertained 550 members of the staff from the home sales organization and the Construction Co., in Northern England, Scotland and Ireland, to a dinner, dance and cabaret at the Palace Hotel, Southport. Among the guests were many former employees who have now retired from the company's service. A vote of thanks to the company for its hospitality was proposed by Mr. R. H. Semple, regional manager, Scotland, and Mr. W. H. McFadzean, deputy chairman and chief executive, replied.

Mr. H. Hewitt, A.M.I.E.E., F.I.E.S., lighting specialist with the North Western Electricity Board, has joined the Atlas Lighting Division of Thorn Electrical Industries, Ltd., as assistant technical sales manager. He is a member of the Council of the Illuminating Engineering Society and was elected a Fellow in May last.

Mr. H. Hewitt

The annual bowls match between the **Liverpool Electric Cable Co., Ltd.**, and its associate company, **Frederick Smith & Co.**, was held at Liverpool's ground on 12th September, when Liverpool were again victorious and therefore retain the "A. N. Smith" cup for a further twelve months.

Sir George and Lady Nelson greet Monsieur Bramel de Clejoulx, head of the French delegation to C.C.I.R., engineer-in-chief of the Radio Branch of the French Post Office, and Madame Bramel de Clejoulx

Mr. A. Kay, of the Salford works, presented the cup, and both teams and their wives were entertained by the Liverpool Co. in the evening.

Mr. C. S. Buyers, hon. secretary of the Scottish Centre of the Institution of Electrical Engineers, retired from that office on 30th September, and it is proposed to make a presentation to him at the annual dinner-dance to be held on 17th November at the Grosvenor Restaurant, Glasgow.

We referred last week to an exhibition of motor control gear at Birmingham arranged by Arrow Electric Switches, Ltd. A photograph taken on the occasion is reproduced herewith

Messrs. B. C. Skinner, T. S. Crabtree and E. H. Foster at the Arrow exhibition

showing Messrs. B. C. Skinner (general sales manager), T. S. Crabtree (managing director) and E. H. Foster (sales engineer). It was stressed at the exhibition that the panel mounting contactors and other auxiliary gear conformed to both B.S. and N.E.M.A. specifications and spares service was available in Canada and the United States.

OBITUARY

Mr. T. J. Mullan.—The death occurred in Edinburgh, on 25th September, of Mr. Thomas J. Mullan, M.A., LL.B., secretary of the South East Scotland Electricity Board. Mr. Mullan, who was born at Alloa in 1902, was educated at Alloa Academy and Mount St. Mary's College, Chesterfield, and graduated in law at Edinburgh University in 1926. Shortly afterwards he joined the Edinburgh staff of Balfour, Beatty & Co., Ltd., managers of the Scottish Power group of electricity supply companies. In 1934 he was appointed secretary of the Grantown-on-Spey and Beauly Electricity Supply Companies, and in 1942 he became assistant secretary of the Grampian, Scottish Central and Fife Electric Power Companies, succeeding in 1945 to the joint secretaryship of the three companies as well as of the Scottish Southern and Scottish Midlands Electricity Companies. On nationalization of the industry in 1948 he was appointed to the post which he held at his death. Mr. Mullan had a wide knowledge of electricity law and practice, and he gave great help to the Board in setting up the new organization in South East Scotland. In 1936 he joined the Edinburgh Foot Special Constabulary and at his death was serving in the rank of inspector. He was a member of the Merchants of Edinburgh Golf Club. Mr. Mullan leaves a widow and three daughters.

The late Mr. T. J. Mullan

Mr. A. Longstaff.—The death occurred on 19th September of Mr. Allen Longstaff, who was for nearly twenty years representative in Europe of Amalgamated Wireless (Australasia), Ltd. Mr. Longstaff left London in 1946 to take up more responsible work for the company in Australia.

Mrs. R. M. Hawkins, wife of the sales director of Belling & Co., Ltd., died suddenly on 15th September.

WILLS

Mr. T. Carter, M.I.C.E., M.I.E.E., Fel.A.I.E.E., for twenty-five years with A. Reyrolle & Co., Ltd., who died on 16th June, left £6,950 gross (£6,899 net).

Mr. J. V. Chaplin, late commercial officer of Colwyn Bay sub-district of the Merseyside and North Wales Electricity Board, who died on 10th July, left £2,608 gross (£2,542 net).

Mr. F. Pooley, M.I.E.E., a founder of Pooley & Austin, Ltd., who died on 19th April, left £12,402 gross (£11,954 net).

STREET LIGHTING SCHEMES

EXETER Council Lighting and Cleansing Committee has approved a scheme submitted by the city surveyor and estimated to cost £12,878 for the improvement of the remainder of the main street lighting. The scheme provides for the erection of 176 new lamps and for the removal of 240 tramway standards, etc.

SCARBOROUGH Corporation Housing Committee has approved proposals submitted by the borough engineer for the provision of further street lighting at Eastfield, and application is to be made to the Minister of Housing and Local Government for consent to the borrowing of the sum of £5,755 to defray the cost of this work.

RUTHERGLEN Corporation has approved a four-year electric street lighting scheme estimated to cost £6,594.

"Automatic" Cooker

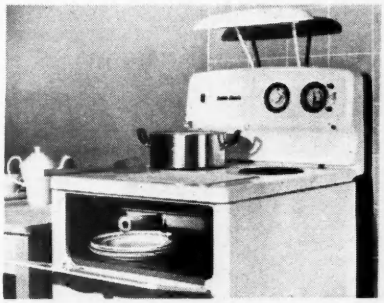
THE introduction of an auto-control panel is the main feature of the new Model 2011 electric cooker which has recently been introduced by the ENGLISH ELECTRIC CO., LTD., Queen's House, Kingsway, London, W.C.2.

This control panel, which plugs into brackets mounted on the backplate of the cooker in place of the normal splashplate, carries two dials—a timer controlling the current supply to the oven and a four-hour clockwork "Ringer."

The timer is set for automatic working by means of three coloured knobs; the white centre knob is the master switch which changes the setting of the oven from normal to automatic control, the cooking period is determined by the red knob and the lower black knob sets the time for switching off. A continuous 6-second warning signal at the end of any pre-selected period up to four hours is given by the "Ringer" and it can also be used to time hob or oven cooking irrespective of the automatic timer.

The left hand side of the control panel houses a neon pilot light controlled by "Simmerstats" and this glows whenever one or more hotplates are in use. Also on this side of the panel is a 13 A shuttered socket outlet which can be used for a kettle, iron, or any one of many other kitchen appliances. A 6 W tubular fluorescent lighting fitting is mounted 6in above the control panel and is so placed as to throw light to the back of the hob.

On the hob are two boiling plates of 6¼ and 8in diameters, loaded to 1,000 and 1,800 W respectively, while the grill boiler is 10½in wide by 8in deep and loaded to 2,500 W.



Hob of the new English Electric "Automatic" cooker showing auto-control panel

The oven contains two pairs of plug-in side elements each of 600 W and two 200 W rod-type bottom heat elements—total loading 2,800 W.

This cabinet type cooker has a cast-iron frame and steel panels which are vitreous enamelled in white. Oven interior and grill chamber are in light dappled grey and the storage drawer and plinth are of dove grey vitreous enamel.

The cooker measures 22in by 24in and the height to hob is 36in and to top of control panel 46in. Suitable for use on a.c. mains only, it has a voltage range from 200–250 V and retails at £55. Radiant hotplates are available at extra cost.

Swan Village Gas Works

IN conformity with the latest practice in modern gas works, two central vacuum cleaning plants, each serving two benches of continuous vertical retorts, are to be supplied by the Sturtevant Engineering Co. to the Swan Village works, near West Bromwich, which are to be inaugurated this month. The two plants are generally similar in equipment and layout and are to be used for heavy-duty bare floor cleaning and other lighter cleaning on the benches and in the retort house. Each comprises a horizontal turbo-exhauster, multiple vee-rope driven by a 7½ h.p. electric motor, and connected at the suction end to a filter receiver. The latter is a cylindrical primary receiver with multi-bag filter, hoppered at the bottom and equipped with a hand operated discharge valve complete with bagging attachment. From each filter receiver, connection is made to a suction main, fitted with a large number of hose connections of standard type for horizontal application, and counterbalanced-lid type for vertical application, the main and its connections covering strategic cleaning points throughout the retort house.

The cleaning tools and accessories are designed to meet the specially arduous and dusty conditions normally existing in retort houses and are used through the intermediary of curved floor handles and, when necessary, extension tubes, or directly at the end of flexible metallic or rubber suction hose, depending upon the cleaning duty being undertaken.

When bare floor cleaning, each plant accommodates one operator, but two or more operators can work simultaneously with the lighter accessories when brushing down walls, ledges, valves and similar items.

Early Accumulators

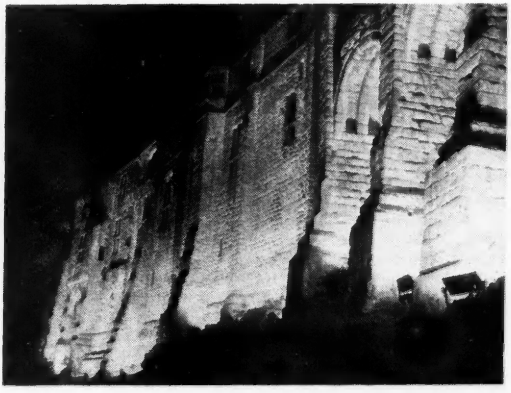
AN article on the accumulator factory at Newport of Crompton Parkinson, Ltd., appears in the September issue of "Industrial Wales." Reference is made to the recent change in the name of the company's batteries from "Young" to "Crompton" and it is recalled that Crompton & Co. were in the accumulator business before 1890. At a factory in Llanelly the Crompton-Howell accumulator was made; this was a joint development of Col. R. E. Crompton and Mr. J. C. Howell, the works manager.

In his *Reminiscences* Col. Crompton mentioned that these accumulators had plates in the form of slabs sawn out of blocks of porous lead. The first production process was the continuous stirring of a mass of molten lead in a pan with slow cooling until when the lead was on the point of crystallization it was cast into porous blocks. The containers were wooden vats lined with lead.

A battery of these accumulators was in service at the Albert Hall, London, for over thirty years.

Dunfermline Floodlighting

DURING the period 29th August to 5th September, the Carnegie Dunfermline Trust held its jubilee celebrations in honour of Andrew Carnegie, who was born in Dunfermline, and as part of the celebrations the Pittencrieff Park remained open during each evening to enable the public to view the floodlighting. In the conservatory, the colours of the blooms were illuminated by appropriate coloured tungsten filament lamps in suitable parabolic angle reflectors. In front of the conservatory, various laid out flower beds were illuminated individually. In the centre of the lawn a fountain springs from a lily pond. In this feature use was made of concealed tungsten filament floodlights and various types of colour filters, such as amber, green and red, with green filtered light directed on to the lawn for contrast. For light relief, the fountain spray was illuminated in amber, green and normal coloured light from underwater units. Close to the entrance from the Abbey a masonry bridge was floodlighted by sodium vapour discharge lighting (Revo Electric, Ltd.). Following the stream, fluorescent colour dimming equipment (Thorn Electrical Industries, Ltd.) gave a variety of hues to the surrounding foliage, by the use of three tube fittings housing combinations of green, white, gold and red tubes. Other features illuminated were the Palace ruins (Revo Electric and Simplex fittings) and the Andrew Carnegie statue, both in sodium vapour discharge lamps. Outside the Park Andrew Carnegie's cottage birthplace was illuminated by sodium vapour lamps. The installation work was executed by the South East Scotland Electricity Board.



The Palace ruins at Dunfermline, floodlighted for the Carnegie Dunfermline Trust Jubilee celebrations

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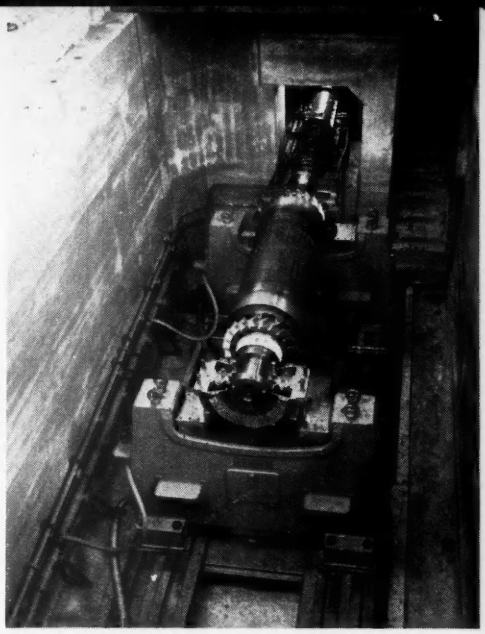
Motor Transport Cost Tables

A USEFUL reference work for all users of commercial vehicles is "Motor Transport Cost Tables and Fuel Consumption Cost Reckoner," published for *Motor Transport* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1 (price 1s, postage 2d). These tables give the latest costs of running all types of goods vehicles, including the vehicle levy that will come into force on 1st January next. Increases in road haulage drivers' wages and in employers' liability for National Insurance, and decreases in vehicle purchase tax and the cost of tyres and petrol and diesel fuel have been taken into account. The tables show the standing costs per year, per week and per hour; the running costs per mile, and the total charge per mile over a range of annual mileages for each size of vehicle, according to the part of the country in which it is based. Factors are included which enable the tables to be speedily adjusted by the user to allow for future fluctuations in fuel prices.

Generators and Switchgear

Improved Manufacturing Facilities at Brush Works



Balancing machine in overspeed pit showing an alternator rotor in position

ON a recent visit to the Loughborough Works of the Brush Electrical Engineering Co., Ltd., we saw a new balancing machine which has been installed to increase the capacity and facilities for balancing and overspeeding alternator rotors. This machine can also be used for balancing at machine speeds the combined alternator rotor and overhung blade system of Brush-Ljungstrom turbo-alternators. It will also ensure both a more accurate balance being obtained and a considerable saving of time.

It will now be possible accurately to balance an alternator rotor, check the balance at machine speed, overspeed, and recheck at machine speed. It will also be possible easily to mount the overhung blade systems on the end of the alternator rotor to balance the completely assembled rotating system.

With the old equipment, it was necessary with rotor weights of up to 7 tons, first to correct the balance in a balancing machine by shaft markings and trial-and-error estimation of the adjustment required. The rotor was then transferred to the overspeed pit for overspeeding and returned to the balancing machine for check balancing. Heavier rotors were balanced in the overspeed pit using electronic apparatus but it required expert knowledge to achieve an accurate balance in a reasonable number of trial runs.

Overspeed Pit

The 61ft long overspeed pit in which the new balancing machine is installed is divided into two chambers. One houses the driving equipment and the other the machine. The power, supplied by tandem d.c. motors giving an output of 1,350 h.p., is transmitted to the balancing machine by a two-speed gear box to give speeds suitable for 1,500 and 3,000 r.p.m. machines. Worm driven barring gear is provided to turn the rotor at 10 r.p.m. and for assisting in the starting of heavy rotors. The balancing machine is in the 14ft deep main pit. This section of the pit is covered by heavy steel and concrete beams.

Control Equipment

The control switchgear and indicating gear is above the motor compartment and the control desk and indicator desk in a cabin 12ft 6in above floor level. The desk carries the regulators and meters of the Ward-Leonard speed control, a master interlocking switch, control buttons and the emergency stop button. The interlocking switch is operated by a " Castell " key which is available only when the safety gate between the motor room and pit is closed and locked.

On the indicating desk are mounted the balancing instrument, the bearing housing locking controls, bearing oil temperature indicators, bearing oil pressure gauge and the alarm system. Green lights indicate current switched on to the alarm gear, to the main oil pump motor and to the gear box oil pump motor. Red lights indicate loss of pressure in the gear box oil system and low oil level in the bearings emergency

oil supply tank. Both red lights are interconnected with a "Klaxon" horn which can be silenced by a cancellation switch.

Both gear box and balancing machine have separate oil systems. A hand oil pump is provided to bring the machine to rest in case of emergency.

Two sets of bearing mountings are provided: (a) for balancing short stiff rotors of 50 tons at speeds of 180 to 1,800 r.p.m. and 14 ton rotors up to speeds of 3,600 r.p.m. and (b) for balancing long flexible rotors up to 20 tons at 3,800 r.p.m. The machine will accommodate with housings (a) rotors 24ft 9in long from drive coupling to outer bearing centre.

The rotors are driven through an adjustable connecting shaft which is coupled through a universally jointed shaft to the end of the rotor. The connecting shaft also drives a phasing generator for balancing and a speed indicator transmitter which operates an indicator in the control room. To each bearing head is attached a moving coil electro-dynamic pick-up which monitors the vibration due to unbalance. The outputs from the phasing generator and from the pick-ups are fed into a wattmeter. Wattmeter readings are taken with phase differences of 90 deg and from these is obtained the magnitude and position of the unbalance. The sensitivity of this system is from 0·0002in to 0·00004in eccentricity of centre of gravity according to the rotor weight.

Research Laboratories

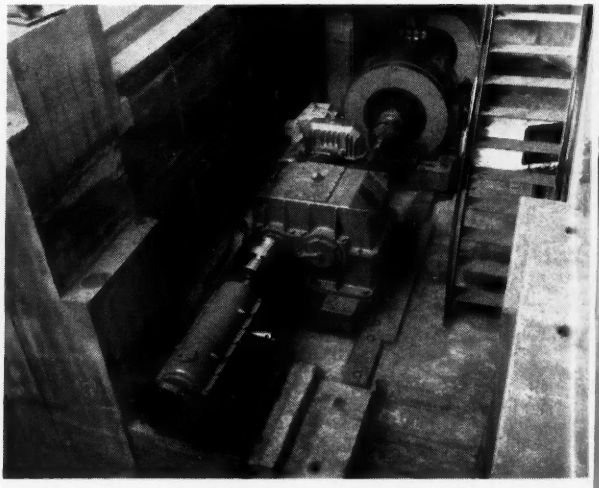
On the occasion of our visit we also had an opportunity of inspecting the research laboratories which are being extended to provide more room for the constantly growing amount of equipment which modern engineering research demands. Here there are seven main divisions, each equipped with the most up-to-date facilities for systematic investigation and research:—Chemical and spectrographic, mechanical and physical, electrical and magnetic, electronic and stress analysis, metallographic, radiographic, and science library (abstracting and translating).

Their essential work lies in the examination of scientific and technical problems arising in development and manufacture, and also in providing technical information on materials and processes in their application to design and to ensure that materials for manufacture conform to specified standards.

A large proportion of the switchgear built at Loughborough is of the metalclad type for voltages up to 15 kV and for breaking capacities up to 350 MVA. There are also under construction outdoor circuit breakers for 33 kV service with a breaking capacity rating of 750 MVA. There is also a range of industrial pattern circuit breakers and high breaking capacity fuse-switchgear, with special control gear for traction and marine service.

The manufacture of switchgear and control gear has recently been brought into a single-storey building having a floor area of about 150,000 sq ft (excluding offices), to double the previous capacity for these products. This switchgear factory has been

The motors and driving gear in the overspeed pit



laid out to facilitate movement of materials, sub-assemblies, finished components and bought-out apparatus from a centrally situated store to the erection bays disposed around it. The erection bay for large switchboards has an area of 41,000 sq ft and that for fuse-switchgear and control gear 15,000 sq ft. Sub-assembly and fabrication sections account for about 56,000 sq ft.

Machining is carried out in central machine shops feeding all product divisions of the Loughborough works and is not accounted for in the space quoted. The despatch department is conveniently placed for loading completed multi-panel switchboards from either of the two principal erection bays with equal facility. A 5 ton crane spans the principal erection area. Railway sidings join directly to the Midland Region tracks of British Railways.

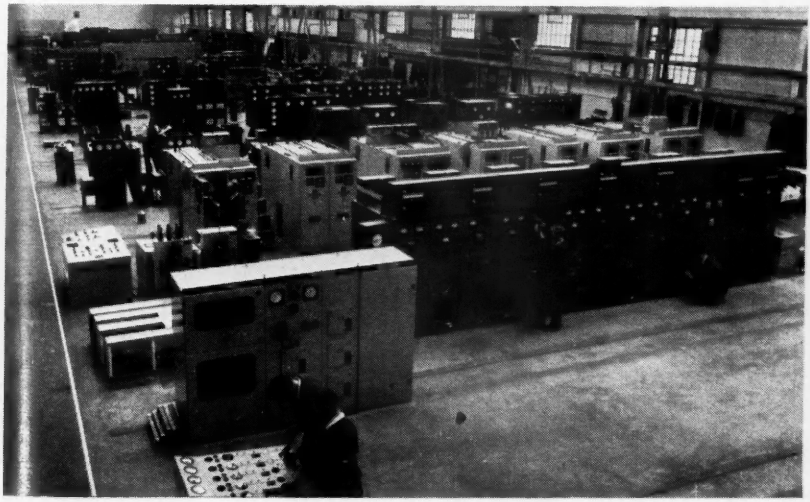
Metalclad Switch Units

At one side of the fixed building lines is an area in which circuit breakers are assembled upon trucks for metalclad switch units before their incorporation in switchboards. Fabrication of the steel structures for metalclad switchgear and control cubicles is in a separate building adjacent to a covered stockyard for steel plates and sections; the majority of the structures are of welded construction and are standardized to a high degree.

Electrical testing before despatch takes place in an enclosure at the despatch end of the erection bays. Here there is a transformer for voltage testing up to 100 kV and current transformers for injection testing, heat runs, etc., up to 3,000 A. It is necessary for most of the electrical testing to be done where the switchboard is erected on the building lines, and at convenient points throughout the erection areas multi-circuit socket outlets are provided, connected to a plug board in the test area. At each testing station it is possible to select various a.c. or d.c. circuits and to control from these stations the field current and speed of alternators for different frequencies and electrical conditions. Test equipment is portable, and on rubber tyred trucks are mounted adjustable transformers for primary injection testing of the switchgear and high-voltage flash testing. Equipment is also provided to check synchronizing equipment.

A separate workshop is provided for development and research, while production control, progress and planning and foremen's offices are situated along one side of the shops and do not intrude into the assembly areas.

General view of the main switchboard erection aisle



CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Waste of Energy

FURTHER to your editorial note and review of the British Productivity Council's report on "Fuel Conservation," and in particular your comment on the better heat insulation of buildings, the writer has long felt that whereas any time this century, article has followed scientific article in the engineering institutions' transactions and national and international committees' reports, nothing drastic gets done about "fuel wastage," if we except the powers—consequently now seldom necessary—to deal in urban areas with excessive smoke, industrial and domestic.

The strictures on the B.E.A. and British Railways will doubtless be read by many competent engineers and some executives, as deep calleth to deep. But one group, a major waster of fuel, the smaller private owners of process steam raising equipment, will in most cases neither have access to nor read the Council's report, this being one facet of the great British public's lack of interest in the subject, Pimlico and Dundee honourably excepted.

Some little publicity has been given to the Government's scheme for giving industry twenty-year loans for fuel saving, the loans to be interest-free for the first two years, but it is fairly safe to say that out of the scores of thousands of owners of Lancashire and other smoke-tube boilers, not 20 per cent have heard of it, or would pay any effective attention if the Ministry of Fuel and Power sent each one a copy of the scheme.

But if the Board of Trade instructed the factory inspectors or the boiler insurance companies' inspectors in, say, ten counties annually, to enter in their annual reports a note that certain boiler owners had not lagged their boilers and/or piping to a reasonable standard, or had not installed a CO_2 indicator or recorder to reduce excess air (penalty £25 for not installing before the next annual inspection) an amazing saving in fuel would ensue in a period of ten years—at least 10 per cent of these boilers' fuel consumption.

More expensive measures, as clean-condensate return and efficient trapping, would be a footnote recommendation in the same annual reports. Low pressure, high temperature heating systems above a certain fuel-consuming capacity would be dealt with similarly.

Richmond, Surrey. JAMES MCCASH.

Lamp Reversal

THE reply given to the *Tit Bits* contribution concerning the reversal of lamps has caught my eye, even at this long distance. I feel bound to ask Mr. W. J. Jones (*Electrical Review*, 21st August) why leave the lamp alone?

A very important factor in getting the light you pay for is the manner in which you maintain your lighting installation, be it in the factory or the home. The E.L.M.A. rate this depreciation in light output as high as 20 per cent in between reasonable maintenance periods, and all due to the accumulation of dirt on lamps and fixtures. Therefore, in my opinion, it is wise to sometimes take the lamp out and clean it, rather than to follow Mr. Jones's advice and "leave it alone."

Salisbury, Southern Rhodesia. H. R. DUNKLEY, ASSOC. (S.A.) I.E.E., M. (U.S.A.) I.E.S.

Electrical Housecraft Classes

FOLLOWING on the successful classes of the past two years, a similar series of classes in practical electrical instruction will again be held at the headquarters of the Electrical Association for Women at 6.30 p.m. on 7th, 14th, 21st and 28th October and 4th and 11th November. The aim of the classes is to enable users to get the best out of their home electrical equipment, and to give opportunities to examine the latest appliances. Applications should be made to the Housecraft Department, Electrical Association for Women, 35, Grosvenor Place, London, S.W.1. A charge of 2s 6d is made for each course of three evenings.

The Institution Examination

Introduction of New Arrangements

PARTICULARS are published in the September issue of the *Journal* of the Institution of Electrical Engineers of the changes which are to be brought about in the Institution examination, consequent on the Council's review which resulted in the change of name from "Associate Membership Examination" to "Institution Examination" by the revision of the bye-laws of the Institution.

It will be recalled that the change in name was made because there was evidence that, although the significance of success in the examination was well understood by members, others were prone to regard that success as meaning that the candidate was entitled to describe himself as an associate member, overlooking the further requirements as to his practical training and the extent of his responsible experience as an electrical engineer.

Effect of Changes

The changes in the actual examination have been designed to enable it to serve as a means of indicating, as well as of assessing, the basic range of knowledge which it is felt essential for the chartered electrical engineer of the future to possess; at the same time it is realized that, in so far as the examination prescribes a series of tests, it can go no further than gauge the minimum standards considered necessary, the proper point for assessing advanced knowledge being at the post-graduate stage.

The revised examination will be in three parts, in contrast to the present two sections. Joint Part I will be much on the lines of the existing Section A of the examination, and it will be held jointly with the Institution of Civil Engineers. Although there will be no change of subjects, the syllabuses have been modified in consultation with the Institution of Civil Engineers, so that greater emphasis will be laid on fundamental principles. This will apply in particular to the subject of "Applied Heat (with Light and Sound)," which will be known as "Heat, Light and Sound."

The modifications to Section B, which will become Parts II and III, are more far-reaching. Briefly, Part II will consist of three subjects: electrical engineering, mathematics and either engineering physics or thermo-dynamics, while Part III will include advanced electrical engineering as a compulsory subject, and a choice of two others from a list of eight. The model examination papers which will be published in due course will demonstrate that Part III places greater emphasis on an understanding of the principles in the various fields than on detailed knowledge of the techniques involved.

The revised examination will come into force by progressive stages from April, 1954, becoming fully effective in October, 1956. The Council recognizes that during this period consequential changes will have to be made in the acceptance of qualifications offered in lieu of the examination. General consideration has already been given to this matter, which, as would be expected, has been borne in mind in making the revisions. It is intended that every qualification at present recognized for complete or partial exemption will be reviewed in relation to the new requirements and during the next year educational establishments will be informed of any change of recognition accorded to their courses.

R.A.F. University Cadets

A GRADUATION parade was held at the R.A.F. Technical College, Henlow, Bucks, on 25th September, to mark the successful completion of the first phase of the training of R.A.F. technical university cadets. The scheme for enrolling and training technical cadets in the Royal Air Force was first considered some three years ago. Last October the first entries of technical university cadets went to the R.A.F. Technical College. The twenty cadets who graduated on 25th September will now undertake a three-year honours degree course in science or engineering at public expense. Fifteen of the twenty are going to Cambridge University, two to Bristol and one each to Oxford, London and Southampton.

Magnetic Flaw Detection

Construction and Operation of Equipment

By C. J. RICHARDS*

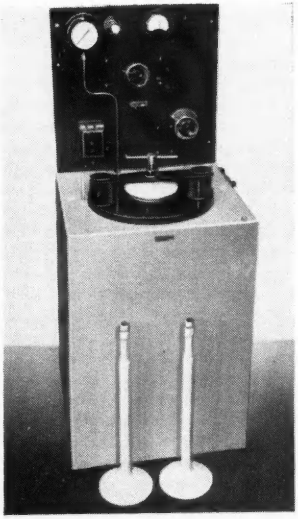


Fig. 1.—General view of the instrument with on valve under test

DESPITE recent advances in gamma radiography and the use of ultrasonic energy in the detection of cracks in metals, magnetic methods still provide the quickest and cheapest method of determining flaws in ferrous materials. The equipment for magnetic detection falls mainly into two groups. In the first the specimen is included in the iron circuit of an electromagnet and in the second a large alternating current from a low potential source is passed through the specimen.

The former method readily finds transverse and circumferential cracks and the latter or current flow method, although principally used for the detection of longitudinal flaws, may, in favourable circumstances, determine cracks at an angle to the current direction. Specimens magnetized by current flow type machines do not exhibit an appreciable external magnetic field except when there is a crack and then only across the crack itself. The flux distribution is in a number of concentric

* Eastern Division, British Electricity Authority.

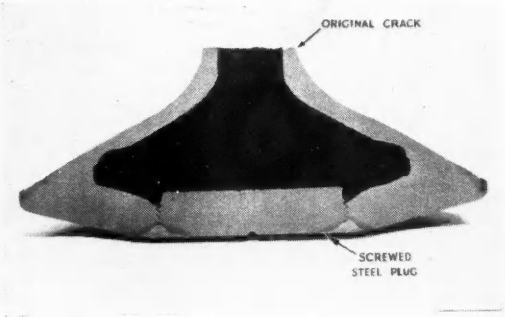


Fig. 2.—Microphotograph of section through valve head, showing effects of corrosion

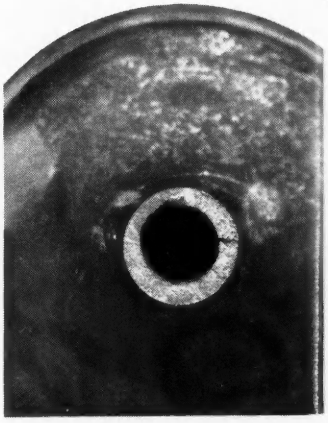


Fig. 3 (*right*).—Fracture in a valve stem

rings as in the common text-book representation of magnetic fields around wires carrying current and thus flaws at right angles to these lines of force will show up predominantly.

The success of flaw detection by magnetic means is due to the many and efficient detection fluids available. Much research has produced a reliable fluid which overcomes the obvious difficulty of producing a mixture of paraffin oils or methylated spirit and iron particles such that the latter remain in suspension in the liquid for considerable periods. To reduce this large difference in specific gravity, the iron particles used are of a spongy nature, holding a considerable amount of air as well as having much of their free carbon eliminated, thus rendering them less susceptible to magnetic retentivity.

It is desirable, however, to control the rate of sedimentation of the particles, the diameter of which should be less than about 5 microns, and to ensure that the sedimented particles do not form a solid cake at the bottom of the container. Slight agitation of the ink must suffice to maintain a uniform suspension of these particles in the carrier fluid and to redistribute such particles after sedimentation.

Apparatus was recently constructed (see Fig. 1) at the Southend generating station of the Eastern Division which illustrates the practice of including the item to be tested in the iron circuit of an electromagnet. The objects in question were large water cooled diesel valves operating in machines of German manufacture dating from the 1914–1918 war.

Under careful maintenance these engines have given long and satisfactory service, yet in recent years they have become prone to accidents due to the fracture of valve heads. These heads when thus fractured fall into the combustion chamber with disastrous effects and, after such a mishap some years ago, great care was taken to detect further faulty valves during each annual maintenance period. One such head (Fig. 2) recently broke off and the examination of the fracture on the valve head indicated that there had been a slow development crack existing some time before the final failure for about a quarter of the circumference (darker portion of the fracture shown in Fig. 3) and that the wall thickness of the stem had been considerably reduced on this side.

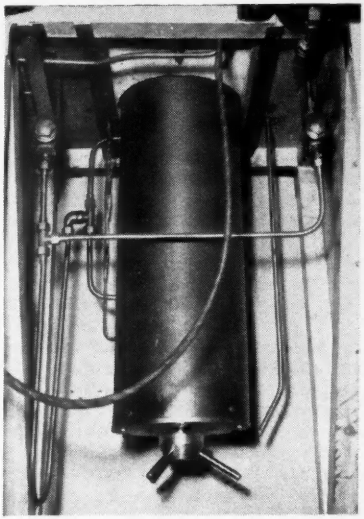
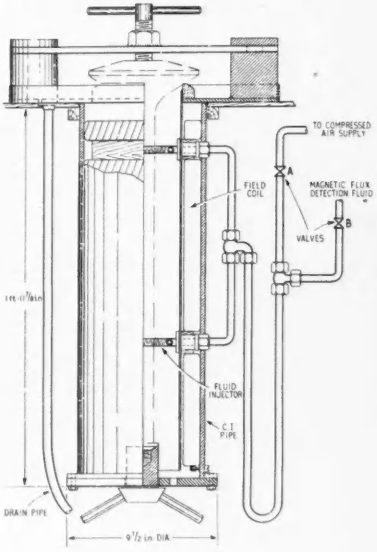


Fig. 4.—Outside cylinder with keeper showing the distribution system including the U bend and valves A and B

Fig. 5.—Main features of the flaw detector



The magnetic flaw detector was built with the object of detecting with certainty any flaws in the stem or on the valve head. The detector injection system (see Figs. 4 and 5) consists essentially of two parts. A magnetic fluid tank at the rear of the instrument panel connects to a U bend copper pipe. The U bend acts as storage for the fluid; one arm of the U is directly connected to a compressed air supply, the other arm leads to two ring distributors located inside the valve chamber (see Fig. 6). A portable air compressor supplies air at a maximum pressure of 75 lb/sq in.

The compressed air enters the system via valve A and thus when the lever of this valve is operated, the air drives the fluid into the valve chamber through the distributor rings. The finely divided particles suspended in the fluid and vapour settle on the stem and on the underside of the valve head.

Berthold investigated the relationship between field strength, the maximum width of flaw that can be indicated, and the effect of depth of the crack. Thus, it appears to be unwise to work below 50 AT/cm, and that little is to be gained from a field strength in excess of 90 AT/cm. For the detection of a sub-surface defect, Berthold recommends values of field strength not exceeding 30 AT/cm to 60 AT/cm to give the most marked effect.

Three coils connected in series and consisting of 4,000 turns of 18 s.w.g. copper wire are placed around the central brass cylinder and these supply a strong magnetic field. Allowing for leakage flux, it is estimated that the instrument is capable of sustaining a field strength of about 100 AT/cm at the valve stem, the coils having an optimum rating of approximately 6 to 7 A, but a suitable magnetic field is obtained at 5 A, i.e., at about 20,000 AT. The flux path is completed through the outer pipe, the crossbar and bolt and, at the base, the keeper or locating nut. By-passing of the flux through the crossbar and bolt enables cracks to be found in the head of the valve. Such flaws originate from welds running around the mild steel screwed plug (see Fig. 2). Direct current is supplied through two adjustable rheostats, a fuse and a starting switch. The valve, having been sprayed with a quick drying white matt paint, is placed in the chamber, the keeper nut locating the lower part of the valve stem, whilst the valve

Fig. 6.—View into the valve chamber showing distributor rings

head rests on the brass ring. The central bolt of the tie bar is now screwed down. The magnetic fluid is allowed to gravitate into the U bend, through valve B, and the current is switched on. The operation of the right-hand valve lever releases the compressed air, which forces the magnetic fluid into the valve chamber.

The whole operation from the starting of the air compressor to the removal and inspection of the valve stem takes less than one minute. Cracks not normally visible to the naked eye show up as thin black lines on a white background (see Fig. 7). They are easily located and no trained personnel is required for the inspection of the valve or indeed for any of the operations involved.

It has been obvious for some time that while the ultrasonic method of flaw detection in boiler drums will indicate caustic embrittlement cracks and other flaws in the shell plate of the drum, the present technique is not readily adaptable to locate such flaws in the butt straps of such drums. Magnetic flaw detection normally involves using a quick drying white paint to provide a matt light background for the black iron particles of the magnetic fluid. Coloured magnetic fluids are in practice less successful especially when the surface to be tested is uneven and not exceptionally clean.

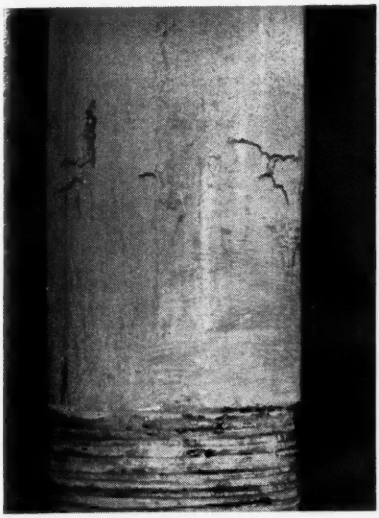


Fig. 7.—Upper part of valve stem showing circumferential fatigue cracks

However, by the use of ultra-violet light and a suitable fluorescent detecting fluid, this previously necessary provision of background is eliminated and a quick method of butt strap inspection of riveted boiler drums can be undertaken (see Fig. 8).

The external butt strap is first brushed to remove the remaining signs of asbestos lagging and loose oxides, and then patches are ground along the outer edges at suitable intervals as shown in the diagram. Employing then a conventional a.c. flaw detector (or in some circumstances a large permanent magnet), current is passed through the outer strap (about 500 A at 1 V) at staggered points both at the same and at opposite edges of the strap, in line with the principal directions along which embrittlement cracks are known to develop, i.e. radiating towards adjacent front or second row rivet holes.

Suitable detection fluid is sprayed across the current path and immediate surface inspection under ultra-violet light clearly indicates such cracks, the length of which penetrates beyond the cover of the rivet head. Such cracks as become visible are naturally already of considerable length and if they appear immediately reflect the condition of the drum under survey.

This type of inspection, though it does not locate smaller cracks, or indeed those originating in the underside of the strap adjacent to the shell plate, nevertheless adequately fills the gap between the U.F.D. method of shell plate inspection and a mere superficial examination which occurs when these butt straps are bared of lagging during a hydraulic pressure survey.

Both straps on a double riveted butt strap joint are normally inspected by this method. However, the internal butt strap is often covered with many layers of Apexior, bitumastic or other protective and great difficulty has been experienced in removing these. Protective paints of this nature tend to penetrate the surface of the underlying metal and continuous machine brushing will only produce a highly polished surface without substantially uncovering the bright metal. In such circumstances it is advisable to restrict this type of investigation to the outside butt strap only. It is, of course, not difficult to see that the technique of magnetic flaw detection involving the use of ultra-violet light finds ready application in locating faults in turbine blading, fan blading, etc., and experiments to that end are already being conducted.

With the increased use of electronic appliances in industry, a variety of flaw

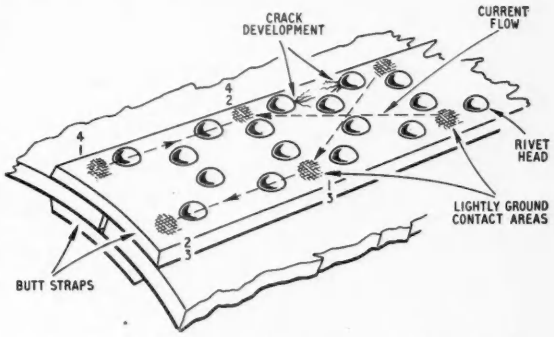


Fig. 8.—Cross magnetization of butt strap. The numbers show the sequence of magnetization by the current flow method

detection equipment is rapidly becoming available to the maintenance engineer. The need for this type of equipment lies not only in the desire for greater safety in plant operation but primarily in the detection of faults during the annual maintenance period when early detection and rectification mean increased availability. The disadvantage of commercially available apparatus lies in the fact that its designers have rarely envisaged the severe operating conditions encountered in practice and great handicaps ensue when this often bulky and sensitive equipment is introduced into the boiler house or on the turbine floor. Furthermore, the time needed to arrive at reliable conclusions has often been overlooked with the result that many maintenance engineers are unable to consider such apparatus as an economic proposition.

The generation of electricity involves the reliable operation of plant and calls for extensive and planned maintenance. There can be no doubt that a great majority of breakdowns of boiler, turbine and auxiliary equipment could be prevented if the right detection appliances were available to the maintenance engineer. Acknowledgment is due to Mr. W. N. C. Clinch, M.I.E.E., M.Inst.F., Controller, Eastern Division, B.E.A., for permission to publish this article.

REFERENCES

"Magnetic Crack Detection," by G. B. Young. Charles Griffin & Co.

"Non-Destructive Flaw Detection," by Dr. R. Schnurmann, F.Inst.P., F.Inst.Pet., M.S.I.T., Chief Physicist, M.O.R. Group of Companies. *Oil*, Vol. 2, No. 3.

Docks Broadcasting Installation

ON 29th September, Sir Leslie Roberts, C.B.E., chairman of the Manchester Ship Canal Co., officially inaugurated the new loudspeaking communication system which has been installed at the Docks. The installation is the first of its kind to be adopted in this country, and its purposes are: first to provide for adequate warnings of any danger, in either isolated spots or the whole of the Docks area, and secondly to provide a staff location system by which the spoken word will be permitted from the main office control room to any part of the Docks or to all parts simultaneously.

The equipment comprises essentially a main amplifier rack and a control desk. The amplifier rack houses five 120 W amplifiers driven by two pre-amplifiers working in parallel. In the event of failure of a pre-amplifier or a main amplifier, the load will be carried by the remaining amplifiers and services will not be interrupted.

Auxiliary equipment on the main rack includes a sound source generator and monitor loudspeaker, the sound source generator operating continuously.

The broadcast of the alarm signal is remotely controlled from the control desk, the main monitor loudspeaker being muted by the microphone switch on the control desk when local announcements are made. The control desk comprises a plain glass topped desk with a small sloping raised portion at the rear about 4in high running the full width of the desk and accommodating a row of control buttons for 16 feeder switches, one master feeder switch, one microphone "on/off" switch, one signal alarm switch and one spare switch. When operated each switch is illuminated in a colour appropriate to its function.

In the centre of the desk is a map of the Docks, and the area associated with each switch is illuminated on the operation of that switch. To sound the alarm the alarm switch is turned and the individual feeder or group feeder switch is operated; thus the alarm can be sounded in any selected area or broadcast over the entire system.

The desk freely commands a forward view of the main P.O. switchboard in front, and the use of a desk stand microphone permits the microphone to be pushed to one side when it is not required.

A separate power amplifier with its driver is provided in a small rack for operating speakers in a remote area of the docks via a Post Office line, and a second microphone is provided in the Docks manager's office in a small desk unit filled with a volume indicator and a cueing lamp.

This industrial broadcasting system was supplied by Central Rediffusion Services, Ltd.

Gas Board Use Two-Way Radio

A MOBILE showroom fitted with v.h.f. radio telephone equipment is being used by the North Western Gas Board. With this showroom the Board can bring appliances to prospective customers on new housing estates and orders can be placed without delay. A two-way conversation can be carried on between the salesman in the showroom and the controller in the Liverpool Group's central control room at Duke Street. The radio equipment was manufactured by A.T. & E. (Bridgnorth) Ltd., a subsidiary of the Automatic Telephone & Electric Co., Ltd., which installed the system.

COMMERCE and INDUSTRY

Permanent Engineering Exhibition

Analysis of Industrial Earnings

THE Birmingham Exchange, which was founded in 1861 to promote the commerce and manufactures of Birmingham and the neighbourhood, is devoting more than £25,000 to the establishment of a permanent Engineering Centre in Stephenson Place, Birmingham. At a Press conference in London last week Mr. C. J. Grazebrook, president of the Exchange, said that work on the Centre was nearing completion and the official opening would be held early next year. The original object has been expanded to include firms from all parts of the country.

The Engineering Centre will, it is hoped, become a modern and progressive engineering organization, and a rendezvous for engineers, consultants, and Government technicians. A close liaison will be developed with foreign consuls in Birmingham and both home and overseas buyers will be encouraged to visit the Centre.

Display space will be available for more than 200 firms, and an active catalogue and technical inquiry service will be maintained. There will also be a register of local firms with available manufacturing capacity; facilities for private short-term exhibitions and trade and technical association meetings; office facilities; and a coffee room.

Steelworks Strike Ended

Because they were told that their action would not have the support of the Electrical Trades Union, the electricians who went on strike recently at the Appleby-Frodingham Steelworks, Scunthorpe, Lincs, resumed work on 23rd September. The men, who are employed by F. H. Wheeler (Sheffield), Ltd., had demanded the dismissal of two foremen whom they alleged had "blacklegged" during the "guerrilla" strikes called by the E.T.U.

American G.E.'s Anniversary

This year the American General Electric Co. celebrates the 75th anniversary of its foundation. From some notes on the subject which we have received it is seen that the organization actually began with the Edison Electric Light Co., which was formed in October, 1878, by Thomas Alva Edison with financial and legal assistance. Later a number of other companies were formed, running parallel with the Edison concern, including the Brush Electric, Bergmann & Co., the American Electric and the Sprague Electric. Several of these, with others bearing Edison's name, were grouped in 1889 to form the Edison General Electric Co., and in 1892 this group and the Thomson-Houston Co. combined to form the present company.

This organization survived a severe financial situation in its earlier years and entered a period of rapid development and expansion for which credit is due to a number of people many of whose names are familiar not only in the United States but all over the world—among them Charles A. Coffin, Edwin Rice, Charles P. Steinmetz, Charles G. Curtis, Charles E. Wilson, Gerard Swope, Owen D. Young and Philip Reed.

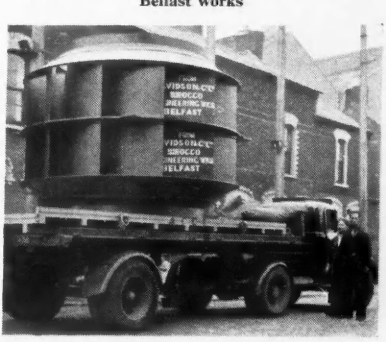
E.P.E.A. Annual Dinner

The annual dinner organized by the South Eastern Division of the Electrical Power Engineers' Association is to be held at the Connaught Rooms, London, W.C.2, on 27th November. The principal guests will be Dame Caroline Haslett, Mr. L. W. Joynson-Hicks, Parliamentary Secretary to the Ministry of Fuel and Power, and Sir Joseph Hallsworth, chairman of the North Western Electricity Board.

Large Mine Fan Wheel

The accompanying illustration shows a "Sirocco" backward aerofoil bladed mine fan wheel leaving the Belfast works of Davidson & Co., Ltd., en route for the Snowdown Colliery, Kent. It weighs almost 7 tons and is designed

A 7-ton "Sirocco" mine fan wheel leaving the Belfast works



to handle 500,000 cu ft of air per minute at 548 r.p.m., with a water gauge of 12in. This type of fan has been developed from the centrifugal backward bladed fan extensively in use for mechanical draught purposes, power stations, etc. Its extension to mine ventilation is a feature worthy of note, and in this connection a number of even larger fans than that illustrated are now in course of manufacture.

Smoke Abatement

Nearly 450 delegates attended the three-day conference of the National Smoke Abatement Society which was opened in Glasgow on Wednesday by the Lord Provost. The Des Vœux Memorial Lecture, delivered by Sir John Charles, Chief Medical Officer, Ministry of Health, dealt with air pollution in relation to preventive medicine. Dr. J. A. Scott (M.O.H., London County Council) spoke on the London "smog" of last December and Dr. A. Parker, Director of the Fuel Research Station, considered the combination of weather conditions and air pollution which had resulted in 4,000 deaths.

Among other matters discussed were smokeless zones, efficient combustion of fuel oil and the production, availability and use of solid fuels. The address of the retiring president, Ald. Professor F. E. Tylecote, M.D., was on "Smoke and the Local Authority." The conference concluded with a visit to the Loch Sloy power station of the North of Scotland Hydro-Electric Board.

E.I.A. Exhibition

The sixth London Regional Display arranged by the Engineering Industries Association is to be held at the Royal Horticultural Society's New Hall from 13th to 15th October. There will be nearly 150 stands on which a wide variety of engineering and allied products will be exhibited.

Dimplex Conference

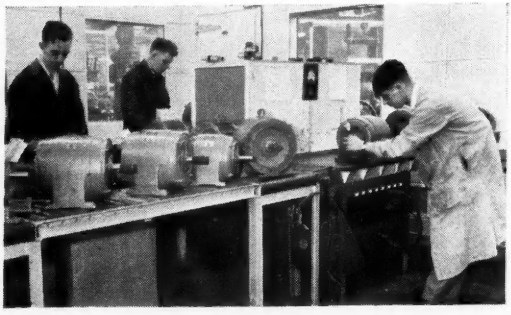
Electrical wholesalers, contractors and Electricity Board representatives attended a sales and service conference arranged last week at the Building Centre, London, by Dimplex, Ltd. In welcoming those present Mr. E. J Wade, the managing director, mentioned that to meet the demand for its radiators the company had acquired new premises near its Totton (Southampton) works by means of which the output would be doubled in the very near future. The latest models of Dimplex oil-filled electric radiators, including flameproof (Buxton certificate) and gas-tight designs, were displayed and described and talks on installation and service were given.

Coventry Wholesalers' Showrooms

The official opening of the Coventry branch of Rich & Pattison (B'ham), Ltd., was celebrated at the Masonic Hall, Coventry, on 22nd September. The celebrations included a reception and dinner at which many well-known local personalities were present. The health of the company was proposed by the branch manager, Mr. A. A. Peters, and in reply Mr. H. P. Rich, managing director, mentioned that the company would shortly be celebrating its golden jubilee. The new branch, which has actually been open for over three months, is now amply stocked to meet local needs and showrooms are available to the trade.

Electric Motor Inspection

Quality control is of vital importance in today's competitive market and to make sure that every product is perfect before leaving the works a new inspection room has recently been constructed at the Huddersfield factory of Brook Motors, Ltd. For many years all motors have been given the usual tests at the end of the assembly line and a final physical inspection of external detail was given after painting. In addition to all the usual component and assembly tests a specially sound-proofed inspection room has now been constructed through which all motors must pass after completion and painting. There are two entry and exit ports forming sound traps at each end of the building, which is placed in the normal flow conveyor system from painting to despatch. Inside the room, from which all factory noise is excluded, four inspectors work in pairs opposite each other on two inspection benches placed at conveyor height. Motors slide easily and no lifting is needed. On the surface plate checks are made for shaft concentricity and centre rise



A section of the new inspection room of Brook Motors, Ltd.

height. The motor is connected and voltage and speed are checked with the nameplate and order details. The inspector then listens carefully to check for noises and vibration. Internal mechanical faults can be instantly detected and if the running sound is higher than normal due to electrical causes, the motor is rejected. While the rejection rate rose for some days after the new inspection room was in operation, this has now dropped to a much lower level than previously and quality has been raised in all sections of production.

Industrial Clothing

The autumn issue of " Uniforms and Industrial Clothing Catalogue " is now available from United Trade Press, Ltd., Boswell House, 9, Gough Square, Fleet Street, London, E.C.4, price 10s. This contains a number of articles describing clothing for particular trades, a simple guide to legal requirements, and a buyers' guide.

Birmingham Electric Club

The annual dinner dance of the Birmingham Electric Club will be held at the Grand Hotel on 16th October. Tickets (35s each) can be obtained from Mr. J. Clement, Geoffrey Buildings, John Bright Street, Birmingham, 1.

B.I.M. Conference

The annual conference of the British Institute of Management will be held at Harrogate from 11th to 14th November. The programme and application forms to attend can be obtained from the Institute Management House, 8, Hill Street, London, W.1. The conference fee is £5 5s excluding accommodation and meals.

Industrial Earnings

Results of an inquiry into wages and hours in industry made by the Ministry of Labour and National Service are tabulated in the Ministry's September *Gazette*. The accompanying table contains figures for the various branches of the electrical industry extracted from the *Gazette*. In the case of women part-time workers are included on the basis of two part-time workers being taken as representing one full-time worker.

English Electric Cookery Book

The latest electric cookery book, one produced by the English Electric Co., Ltd., is a very handsome example of its class. Over four hundred recipes of all kinds, many of them novel, are given and there are special sections on sauces, pickling and jam making, fruit preserving, bread making, invalid cookery and baby foods. A few prefatory pages are devoted to the English Electric cooker and its correct use and a number of attractive colour plates are included.

Valve Manual

The G.E.C. has just issued the " Osram Valve Manual, Part II," which includes full technical data and characteristic curves of current transmitting and industrial valves with tabulated information on maintenance types. In addition sections on the design of r.f. oscillators and amplifiers, on the interpretation of ratings, and on operating precautions make it a useful reference book for the engineer as well as a complete catalogue of " Osram " transmitting valves. The manual is available through dealers, price 10s, or from the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2, price 10s 9d (including postage).

Conference on Phosphating

Delegates from Great Britain, the United States, France, and Western Germany, including the world's acknowledged experts in the industrial phosphating field, met in conference last week at the Pyrene Co., Ltd., Great West Road, Brentford, Middlesex, for an exchange of technical information and to discuss future developments of the internationally known and used " Bonderizing," " Parkerizing," and " Parco-Lubrizing " range of industrial phosphating processes. The conference, the first of

EARNINGS IN THE LAST PAY WEEK IN APRIL, 1953

Branch	Men (21 & over)		Youths & Boys		Women (18 & over)		Girls		All workers	
	Week	Hourly	Week	Hourly	Week	Hourly	Week	Hourly	Week	Hourly
	s. d.	d.	s. d.	d.	s. d.	d.	s. d.	d.	s. d.	d.
Electrical machinery..	201 6	49·2	73 5	20·3	110 3	31·1	63 6	17·8	167 9	42·7
Electric wires & cables	188 8	46·9	77 10	21·5	102 11	29·2	59 6	17·3	156 1	40·5
Telegraph & telephone apparatus	187 4	49·0	74 11	21·1	111 7	31·2	69 9	19·5	153 0	41·2
Radio apparatus & gramophones ..	190 10	48·4	72 9	20·1	107 3	30·1	67 0	19·1	143 5	38·3
Radio valves & electric lamps	186 8	47·4	76 7	20·9	109 5	31·0	72 8	20·2	137 2	37·1
Batteries&accumulators	199 4	52·5	—	—	108 8	32·2	—	—	169 8	46·4
Other electrical goods	194 11	49·6	71 10	19·4	105 2	30·3	61 6	17·5	155 4	41·2
Electric wiring & contracting	184 4	45·8	60 11	15·9	87 9	26·9	—	—	147 3	37·2
Electricity supply ..	173 8	43·5	74 8	20·2	98 9	28·8	—	—	166 5	42·0

its kind ever to be held, was conducted under the chairmanship of Mr. W. E. Wright, a director of the Pyrene Co., who also headed the British delegation. Leaders of the visiting delegations were: Mr. R. W. Englehart (Parker Rust Proof Co.), United States; M. Dete (Societe Continental Parker), France; and Dr. Wilhelm Overath (Metallgesellschaft A.G.), Germany.

Arts and Crafts Exhibition

This year's Arts & Crafts Exhibition organized by the South Western District Joint Advisory Council of the Electricity Supply Industry was probably the most varied the Council has yet staged. Opened on Saturday afternoon at Electric Hall, Torquay, by Mr. H. Midgley, deputy chairman of the South Western Electricity Board, the exhibition attracted over 300 entries from employees of the Board and the South Western Division of the British Electricity Authority and their families. Most of the prize-winning entries will be shown at a national exhibition in London in February. The 21 classes ranged from oil paintings, water colours and drawings to a comprehensive photographic display, models of 17th century galleons, toys, metalwork and woodwork.

Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £150 0s 0d
COPPER, H.C. Electro	ton £232 10s 0d
Fire Refined 99·70 per cent ..	ton £231 0s 0d
Fire Refined 99·50 per cent ..	ton £230 0s 0d
COPPER Tubes	lb 2s 3½d
Sheet	ton £294 0s 0d
H.C. wire and strip	ton £267 0s 0d
LEAD, English	ton £92 10s 0d
Foreign	ton £91 5s 0d
MERCURY..	flask £64 15s 0d
TIN	ton £607 10s 0d
ZINC, G.O.B. Foreign	ton £69 0s 0d
Electrolytic	ton £70 15s 0d
BRASS Tubes	lb 1s 10¾d
Sheet	ton £235 15s 0d
Wire	lb 2s 5¾d
PHOSPHOR BRONZE	
Wire	lb 3s 8¼d
RUBBER, No. 1 R.S.S. spot ..	lb 18¾d–18⅞d

Belfast Plant Contracts

On 25th September the Belfast Electricity Committee recommended that tenders for six contracts for the supply of plant and equipment at the new Victoria power station should be invited by public advertisements. Quotations for the work had been accepted earlier from selected tenderers.

The recommendation follows the recent special meeting of the Council at which it was decided that tenders for one of the contracts—the supply of seven boiler units—should be publicly advertised. This decision by the Corporation was made as an amendment to a recommendation of the Electricity Committee asking the Council to record that special considerations existed in their awarding a contract amounting to almost £3,000,000 to Babcock & Wilcox, Ltd., one of the five companies which were invited to tender.

The six contracts which the Committee now proposes to advertise include that for the seven boilers and one for the supply and erection of two turbo-alternators for which the tender of C. A. Parsons & Co., Ltd., had been accepted earlier. The tender for the boilers was the only one which had been in dispute at the special meeting of the City Council.

Belling's New Catalogue

We regret that the advertisement of Belling & Co., Ltd., on page 113 of this issue appears prematurely. Readers are invited in the advertisement to apply for the company's new catalogue and showcard but they should not do so yet. These will be circulated throughout the trade very shortly and any readers who do not then receive them should write to the company.

Trade Announcements

The Glasgow branch of **W. T. Henley's Telegraph Works Co., Ltd.,** has moved to more commodious premises at 149-153, North Street, Glasgow, C.3 (telephone: Central 1771).

The address of **Tok Electrical & Industrial Mechanisms, Ltd.,** a subsidiary of Bentima & Co., Ltd., is now 264-270, St. John Street, Clerkenwell, London, E.C.1. **S. Davall & Sons, Ltd.,** another subsidiary of Bentima, will remain at 2, Wadsworth Road, Perivale, Greenford, Middx.

E. F. Electric, Ltd., will in future distribute its range of electrical wiring accessories direct to the trade.

Catalogues and Lists

Cambridge Instrument Co., Ltd., 13, Grosvenor Place, London, S.W.1.—Specification sheet giving details of 4in and 6in dial thermometers (307).

The National Lighting Co., Ltd., 40, Manchester Street, London, W.1.—Illustrated priced catalogue of table lamps and lamp shades.

Teddington Industrial Equipment, Ltd., Windmill Road, Sunbury-on-Thames, Middx.—Illustrated catalogue of "Teddington" electric proportioning equipment—series ZA (TIE.503).

Rowlands Electrical Accessories, Ltd., R.E.A.L. Works, Hockley Hill, Birmingham, 18.—40-page illustrated priced catalogue of "R.E.A.L." lighting equipment (P.5302).

OVERSEAS ELECTRICAL TRADE

Improvement in Exports Not Maintained in August

AFTER the encouraging showing for July, when exports of electrical apparatus and machinery, totalling £16,035,566, were £477,219 higher in value than in the corresponding month last year, August's figures are somewhat disappointing. It was to be expected that as a holiday month they would be lower than for July, but the total of £12,571,887 is also £755,827 lower than in August last year. As Table I shows, the decline in trade is more noticeable in regard to machinery than "goods and apparatus."

Analysing the electrical machinery exports further, it appears that most of the decline is traceable to reduced buying of

TABLE I.—ELECTRICAL EXPORTS

Class	August, 1952	August, 1953	Class	August, 1952	August, 1953
	£	£		£	£
Telegraph and telephone cables and wires (submarine)	14,489	21,532	Insulating cloth and tape	43,929	35,495
Ditto, not submarine	453,388	428,881	Other insulating materials	64,572	49,338
Cables and wires, paper insulated	710,381	638,345	Unclassified electrical goods and apparatus	532,876	503,359
Ditto, rubber insulated	466,755	291,488	TOTAL, electrical goods and apparatus	7,496,344	7,279,585
Ditto, cotton, silk or artificial silk insulated	57,281	43,637			
Ditto, enamel, glass or asbestos insulated	52,919	71,595	Diesel driven generators, not exceeding 10 kW	296,177	89,382
Ditto, other	254,721	229,214	Ditto, over 10 kW to 65 kW		125,895
Commercial radio apparatus	673,194	848,799	Ditto, over 65 kW to 200 kW		60,181
Domestic radio apparatus	326,168	257,198	Ditto, exceeding 200 kW	122,910	180,199
Telegraph, telephone and signalling apparatus	1,215,508	1,367,364	Other generating sets	174,089	249,729
Loudspeakers and microphones	38,449	34,985	Generators and parts of generators	798,697	850,230
Radio, telecommunication and electronic apparatus components and parts, n.e.s.	435,830	356,241	Motors, railway, tramway and trolley-bus	520	20,949
Other radio, telecommunication and electronic apparatus	117,494	252,981	Ditto, others not over ½ h.p.	127,705	102,243
Cathode ray tubes	5,873	11,841	Ditto, over ½ h.p. but under 1 h.p.	53,129	29,192
Other valves	337,080	160,241	Ditto, from 1 h.p. to 250 h.p.	352,502	333,348
Carbons	12,220	17,627	Ditto, exceeding 250 h.p.	100,255	35,661
Lamps, exceeding 24 V	53,521	50,715	Ditto, parts	64,420	120,976
Ditto, not exceeding 24 V	19,578	17,341	Converting machinery	19,246	13,882
Other lighting appliances	395,219	352,250	Transformers, including coils	831,311	831,387
Primary batteries	139,921	178,038	Mercury arc rectifiers	46,802	22,440
Parts other than carbons	15,759	28,204	Motor starting and controlling gear	236,661	157,879
Accumulators for motor vehicles	129,946	108,765	Switchgear and switchboards (not telegraph and telephone)	1,517,010	1,261,515
Ditto, traction	27,247	18,631	Electrical machinery, n.e.s.†	387,659	112,142
Ditto, radio	2,908	3,248	TOTAL, electrical machinery	5,129,093	4,597,230
Other portable accumulators	143,349	56,203			
All other accumulators	32,465	46,634			
Parts and accessories	27,836	36,176			
Cooking appliances	65,691	69,820	Washing machines (not exceeding 150 lb weight)*	231,505	149,903
Heating appliances	55,177	60,789	Ditto (over 150 lb but not exceeding 250 lb weight)*		70,498
Parts and accessories for cooking and heating appliances	62,830	57,357	Ditto, parts	16,960	19,484
Flat irons	55,103	54,364	Vacuum cleaners	89,705	85,835
Commercial electrical instruments	108,259	136,186	Ditto, parts	9,993	27,997
House service meters	96,784	66,753	Other electrically operated portable appliances	103,924	134,697
Time recorders and time switches	3,418	8,222	Portable electric tools	104,606	83,221
Other electrical instruments	105,366	126,134	Electrical pottery and glassware, including insulators	114,854	66,689
Electro-medical apparatus (not X-ray)	31,922	39,688	Electrical conduit tubes and cased tubes	30,730	56,748
X-ray apparatus, other than tubes and valves	51,434	53,199			
Vacuum tubes	32,621	53,885			
Permanent magnets	26,863	36,822	GRAND TOTAL	13,327,714	12,571,887

* Not separately distinguished in 1952.

† The two figures are not comparable.

equipment other than motors and generators, the actual figure for August being £2,399,245, compared with £3,038,689 in August, 1952. The only item covered by this classification which does not show a reduction is transformers (£831,387, compared with £831,311). Exports of motors were £56,162 down at £642,369 but there was an improvement from £1,391,873 to £1,555,616 in the overseas business in generators, both South Africa (£117,752, compared with £91,212) and Australia (£308,034, compared with £127,242) being among the countries buying more. Shipment of generators to Canada disappointingly fell from £409,161 to £163,353.

Table II.—Distribution of Electrical Goods and Apparatus

Destination	August, 1952	August, 1953
	£	£
Channel Islands	24,139	27,931
Gibraltar	9,114	24,195
Malta and Gozo	14,040	24,240
Cyprus	14,299	51,701
Gold Coast	49,349	72,338
Nigeria	87,376	127,400
Union of South Africa ..	691,018	625,899
Northern Rhodesia	62,514	52,697
Southern Rhodesia	164,497	98,780
British East Africa	300,558	157,747
Bahrein, Qatar and Trucial Oman	15,608	36,852
Kuwait	39,939	100,211
India	923,624	530,800
Pakistan	111,779	202,743
Malaya	293,408	261,620
Ceylon	74,847	105,107
Hong Kong	252,030	97,134
Australia	663,120	473,298
New Zealand	408,299	629,901
Canada	227,554	311,550
British West Indies	95,905	83,788
Anglo-Egyptian Sudan ..	40,854	58,091
Other Commonwealth Countries	102,300	162,161
Irish Republic	192,407	118,493
Soviet Union	21,293	6,544
Finland	61,166	21,276
Sweden	320,663	220,604
Norway	118,520	129,076
Iceland	16,093	16,619
Denmark	69,415	79,637
Poland	10,993	3,224
Western Germany	42,456	76,336
Netherlands	184,691	180,465
Belgium	84,712	307,264
France	71,466	131,502
Switzerland	42,206	45,856
Portugal	77,194	114,079
Spain	73,721	89,813
Italy	85,730	144,135
Austria	16,729	57,602
Czechoslovakia	8,626	491
Yugoslavia	35,231	23,055
Greece	28,211	29,764
Turkey	97,008	51,307
Portuguese East Africa ..	10,018	14,057
Syria	16,154	15,940
Lebanon	26,392	17,723
Israel	10,535	46,026
Egypt	145,564	41,944
Arabia	11,035	34,574
Iraq	109,820	176,592
Iran	15,639	15,990
Burma	110,668	93,584
Thailand	65,962	34,579
Indonesia	24,908	52,447
China	238	—
United States of America ..	78,899	104,883
Colombia	44,502	28,347
Venezuela	104,668	79,495
Peru	26,659	19,067
Chile	21,469	31,913
Brazil	111,005	62,172
Uruguay	20,071	10,048
Argentine Republic	47,190	40,655
Other Foreign Countries ..	170,246	196,223
Total ..	7,496,344	7,279,585

Substantially increased buying of electrical goods and apparatus by New Zealand (from £408,299 to £629,901), Canada (from £227,554 to £311,550) and a number of European countries failed to counterbalance reduced shipments to India. British East Africa, Hong Kong, Australia and Sweden (see Table II).

Imports of electrical goods and apparatus rose from £508,312 in August, 1952, to £675,070 this year, the largest items being radio and telecommunication equipment £250,974 (£224,099) and valves £165,886 (£83,897). The largest suppliers were the Netherlands (£205,771) and the United States (£124,254). Imports of generators declined in value from £46,627 to £30,779 while those of motors rose from £28,835 to £31,428. There was an increase from £40,953 to £56,890 in imports of other electrical machinery.

Exporting to Canada

THE 1954 edition of the "CABMA Register of British Products and Canadian Distributors" is now in active preparation. Some exporting firms interested in developing Canadian business were not represented in the 1953 edition because the publishers' questionnaire was not completed and returned.

All member firms of the supporting organizations (the Dollar Exports Council, the Federation of British Industries, the Association of British Chambers of Commerce, the National Union of Manufacturers, the Scottish Council (Development and Industry) and the Northern Ireland Industries Council) who have indicated their interest in the Canadian market will shortly receive details of the new Register from Kelly's Directories, Ltd., who are joint publishers with Iliffe & Sons, Ltd. Any firms who have not as yet indicated their interest and who are currently exporting to Canada should write to Kelly's Directories, Ltd., 186, Strand, London, W.C.2, without delay. Those who receive questionnaires during the course of the next few days should return them promptly.

ELECTRICITY SUPPLY

Consultative Council Machinery

Tariff Structure Discussions

THE North Western Electricity Consultative Council, in a report issued last week, urges that Electricity Boards should be required to give the Councils three months' notice of plans to revise charges to consumers. The report states that the Councils, set up to watch over consumers' interests, should cease to be paid by the nationalized industry itself. Salaries and expenses should be the responsibility of the Ministry of Fuel and Power. Other recommendations include a demand that the Councils should have their offices at town halls instead of at Board headquarters and that the name Consultative Council should be changed to Consumers' Council. Councils should meet at least six times a year, and should be allowed a reasonable sum for publicity in order to make their existence known to a wider public. Councils should not merely wait for information to be given to them by Boards. They should take a more positive line of their own. The report says it is entirely wrong that the secretarial work of district committees should be handled by Electricity Board officials

South Wales Tariffs

The South Wales Electricity Consultative Council last week criticized the Board for delay in revising tariffs. Before the Council was a letter from the Board stating that consideration was being given to the anomalies arising from the application of the present tariff formulæ.

At its previous meeting the Council had suggested that the primary number of " units " should be the same for all consumers irrespective of the number of rooms in the premises and that the primary rate should be reduced.

The Board's reply was that the Council's proposals, if adopted, would be at variance with the national approach to domestic tariffs. While there was much to be commended in the suggestions, the proposed structure would cause some difficulty and must, therefore, be discussed fully with the Retail Tariffs Committee for the industry before a final answer could be given. Arrangements were being made for this discussion to take place as soon as possible. A review of existing anomalies as they affected Electricity Boards would take place at the same time.

The anomalous position of licensed premises under the commercial tariffs was spoken of by Mr. E. T. Kinsey Morgan (Rhayader), who said that licensed houses in South Wales were being assessed on the number of outside buildings and parts of houses which might not be even wired for electricity. He considered that the assessment was very unfair.

The Council's chairman said that the Board had promised to review the tariffs at the end of a year's working. Hotels and licensed premises could not be separated from the commercial tariff. Revision of the commercial tariff would not be so simple a matter as that for domestic consumers.

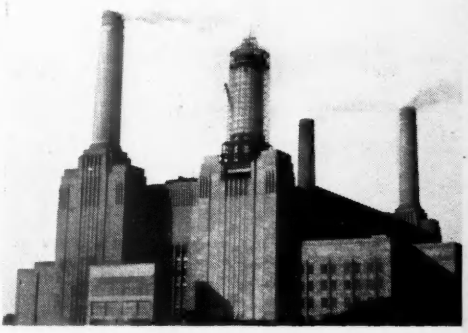
Rye House Power Station Extension

The British Electricity Authority has received the consent of the Minister of Fuel and Power to the extension of Rye House power station, near Hertford, by two 32,000 kW turbo-generator sets and two 350,000 lb/hr boilers. When completed the station will have a total installed capacity of 192,000 kW.

Progress at Battersea

The fourth chimney of Battersea power station, which will change the appearance of this familiar London landmark, is rapidly stretching up to the 337ft of its three fellows. The new chimney will complete the second

Battersea power station with the new chimney in course of construction



section of the power station, construction of which was held up by the war and post-war shortages. The combined capacity of the two sections will be 503,000 kW.

New Substation at Penrith

The North Western Electricity Board has officially opened a new substation at Penrith (Cumberland) intended to reinforce electricity supplies for East Cumberland and North Westmorland. The substation is fed by a 132 kV line from the grid and the ceremony of switching the power from the main supply to the substation was performed by Mr. T. W. Jackson, vice-chairman of Penrith U.D.C. The chairman of the North Western Electricity Board, Sir Joseph Hallsworth, said that the Board was doing all it could to meet the demand, but was subject to restrictions on capital expenditure.

Bradford Bakers' Further Move

Following protests about the increased cost of both gas and electricity for heating their ovens, members of the Bradford and District Association of the Baking Industry decided on 21st September, that as their protracted negotiations with the respective Boards had led to no satisfactory result they would follow up their decision to recommend members to convert their ovens to oil fuel heating by forming two separate sub-committees, one for those using gas and the other for those using electricity, to consider the position further, if desirable to approach the oil companies for advice on the subject of oil fuel heating, and to report their findings to the Association with a view to supporting its recommendation for a change-over to oil fuel.

Emergency Supply for Railway Yards

The railway marshalling yards at March fulfil the important function of distributing the railway traffic which flows between the whole of East Anglia and the Midlands, the North and Scotland. These yards operate continuously night and day and stoppage there would result in traffic chaos over a very large area. Therefore the railway authorities, finding it necessary to make certain adjustments to the existing steam generating plant, arranged to take electricity from the grid for the period of the overhaul. However, the high winds on the night of 21st September damaged the overhead wires with the result that supply failed completely at 6 a.m. the following morning. Emergency repairs were immediately made by the electricity authorities and electricity was again available by 4 p.m.

In view of the temporary nature of the repair and the possibility of a further failure an "S.O.S." was sent to Davey, Paxman & Co., Ltd., of Colchester. The message reached the company at 4 p.m. and an immediate assurance of help was forthcoming. The difficulty was overcome by taking a 330 kVA diesel generating set from the manufacturing line and throughout the night maintenance and service engineers laboured on the transfer of the set to meet its new duties, with the result that it was handed over to the railway authorities at the Hythe Station, Colchester, before breakfast next morning.

Special arrangements were made by the railways to have a suitable wagon and crane available at the local sidings, and immediately the generating set was loaded the train started its journey to March. This precaution was apparently fully justified as a further breakdown of the power line occurred and the set was put into full operation shortly after its arrival.

Erne Hydro-Electric Development

The £1,000,000 Erne hydro-electric scheme is now well under way, and a temporary township to accommodate hundreds of workers is taking shape on the banks of the river Erne at Belleek. The scheme will give work to 500 men for five years, and portions of County Fermanagh will be transformed. Fields which have never before been tilled will carry crops, for flooding will be prevented.

Pontoons for use in the scheme are being completed at the Belfast shipyards of Harland & Wolff. Blasting of rock has already commenced and it is estimated that on one stretch of the river more than a million tons of rock and soil will be displaced.

I.E.E. Supply Section

ON 24th to 27th September the Supply Section of the Institution of Electrical Engineers held its summer visit at Porthcawl, South Wales, with headquarters at the Seabank Hotel where on the first evening a film was shown on the operation of the Abbey section of the works of the Steel Company of Wales, Ltd., Port Talbot.

On 25th September, there were visits to the works of the Metal Box Co., Ltd., Neath, and National Oil Refineries, Ltd., Llandarcy, the Neath Abbey Woollen Mills, and the Abbey section of the works of the Steel Company of Wales, while there was a lunch for the whole party at Llandarcy as the guests of National Oil Refineries, Ltd., tea at Abbey as the guests of the Steel Company, and a dinner-dance at headquarters in the evening as the guests of the South Wales Electricity Board.

On Saturday there were visits to the Ffaldau and Wyndham Collieries of the South-Western Division of the National Coal Board and to St. Donat's Castle at Llantwit Major.

Before returning home on Sunday there was an excursion to Brecon, the party lunching at the Castle of Brecon Hotel.

Electrical Industries Golf Championship

National Final at Leeds

THE National Final of the Electrical Industries National Golf Championship, 1953, was held at Sand Moor and Moortown Golf Clubs, Leeds, on 21st and 22nd September. Once again bad weather prevailed.

On 21st September, the National Final was held on the Sand Moor course and the winner of the Sir Montague Hughman Championship trophy was Mr. E. R. Hill (Percy W. Hill & Co., Wednesbury, Staffs). The runner-up, who received the J. L. Wilson cup, was Mr. A. G. Richards (South Eastern Electricity Board). The J. Y. Fletcher cup for the best scratch score was won by Mr. H. R. Harding (Helsby, nr. Warrington).

In the afternoon the foursomes trophies donated by Sir Felix Pole were won by Mr. A. G. Gray (G. F. Gray, electrical contractors, Nottingham), and Mr. R. Westcott (British Insulated Callender's Cables, Ltd., Erith). The runners-up were Mr. J. Bold (Kennedy and Donkin, Manchester) and Mr. A. O. Johnson (North Western Electricity Board, Manchester). The competition for the visitors' trophy, donated by the Electrical Wholesalers' Federation, was held on the same day at Moortown Golf course and was won by Mr. W. A. Roberts (Castleford, Yorks). The runner-up was Mr. F. A. White (Roundhay, Leeds). The best scratch score was put in by Mr. W. Hyland (South Wales Electricity Board, St. Mellons, Cardiff).

Mr. E. A. Mills (left), deputy chairman, London Electricity Board, with Sir Henry Self, deputy chairman, B.E.A., on the course during the veterans' match

In the evening a dinner, attended by 180 people, was held at the Great Northern Hotel, Leeds, with Sir Henry Self, the chairman of the National Committee in the chair. A toast to the E.I.B.A., coupled with the name of Sir John Dalton, was proposed by Mr. A. Haselhurst, chief commercial officer, Yorkshire Area Board. Sir John Dalton, this year's president of the E.I.B.A., responded, and told the assembled company that the Electrical Industries' National Golf Championship hoped during the current year to obtain over £2,000 for the E.I.B.A. funds.

A toast to the guests was then proposed by Mr. G. A. Vowles, controller, Yorkshire Division, B.E.A. Mr. Neville Shute, captain of the Sand Moor Golf Club, replied. A toast to the Electrical Industries National Golf Championship was proposed by Mr. H. Senior Fothergill, to which Sir Henry Self replied. During the course of his reply, Sir Henry expressed the gratitude of all concerned to Mr. F. H. Farthing, the hon. national secretary, and Miss E. Woodley, for the work which they had done during the year. He also drew special attention to the fact that Mr. W. Plumb, manager of the English Electric Co.'s branch at Leeds, had been responsible for all the arrangements for the dinner. Following the speeches, Sir Henry distributed the trophies which had been won on that day.

On the following day, in slightly better weather, the veterans' competition was held on the Moortown course. The winner of the trophy, presented by the *Electrical Journal*, was Mr. G. F. Sills (Manchester). Also during the day the open Stableford competition was held on the Sand Moor course, and resulted in a win for Mr. L. G. Chittenden (Wall and Attwooll, Ltd.).

British Paper for Italy

Technamacio Italiano Brown Boveri of Milan recently required Kraft paper in a continuous reel to a width of 5,000 mm (197in) for insulating a special transformer of 1,300 kV for laboratory use. The Reed mill at Aylesford, Kent, was the only one in Europe able to produce the paper in this unusual width, and the company received the order direct.

RECENT INTRODUCTIONS

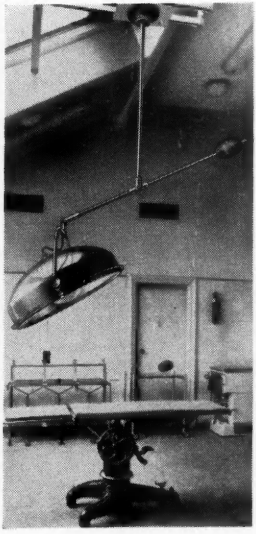
Notes on New Electrical and Allied Products

Operating Theatre Light

THE 36in operating theatre lighting fitting recently developed by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, gives a shadowless light, more than 3,000 lumens/sq ft using a 150 W pearl g.s. lamp at a distance of 32in. Three b.c. lampholders to take 60 W lamps are provided in the fitting for connection to an emergency circuit. Focusing for maximum intensity is instantaneous. A large knob within easy reach is connected by a shaft and flexible coupling to an eccentric focusing mechanism. This enables the light to be concentrated for deep penetration of cavities.

Finger touch control of the delicately balanced suspension system is provided for adjusting the angle or position. The ceiling unit houses a sparkless slipring giving all-round movement. If the position of the fitting in relation to the operating table is carefully planned, travelling rails are not normally required but can be provided for special purposes.

The counterbalanced arm suspension enables the fitting to be used in theatres where the ceiling height is as low as 9½ft. The fitting is made of heavy gauge spun aluminium with a white stove-enamel finish. The inner reflector is of high-purity aluminium with an anodized finish. All bright metal parts are chromium-plated. The fitting is dust-tight and has a clear "Perspex" front with an easily removable central dish of opal "Perspex" for cleaning and relamping. The weight is 150 lb.



Left: **G.E.C. operating theatre lighting fitting**

Centre: **"Kaloric - Mayfair" convector heater**

Right: **"Wavemaster" washing machine**

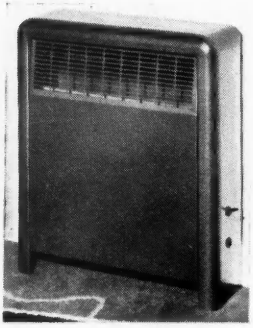
Convector Heater

The "Kaloric-Mayfair" cabinet type convector heater made by M. & J. Lossos & Co., LTD., 31, Beethoven Street, London, W.10, is available with loadings of 0·75, 1, 2 and 3 kW. It is of attractive appearance and is made of sheet steel with a sprayed bronze cellulose or cream stove enamel finish. The 2 kW model is provided with a switch, enabling the loading to be reduced to 1 kW, while the 3 kW heater is equipped with two switches to give 1, 2 or 3 kW. The whole range is available with incorporated thermostats.

Portable Washing Machine

The "Wavemaster" electric washing machine which has just been placed on the market by MARLOW & WILDMAN, LTD., 25, St. Pancras Way, London, N.W.1, is a completely portable appliance and very simple in operation.

The machine is in three main parts consisting of the outer bowl, the flow chamber and the power lid. The bowl, which is of spun aluminium, has a maximum diameter of 14in



excluding handles, and a capacity of six gallons. The flow chamber may be likened to an inner bowl but with a cut-away base and this slips inside the main outer container. Rubber lugs on the bottom and sides ensure an even space all round. A 375 W Delco-Remy universal motor is housed in the domed lid and all moving parts are completely enclosed thus obviating any danger either to the clothes or the user.

When in operation the motor drives a suction fan in the top compartment, causing a rapid circulation of air through the clothes, which are thereby cleansed without harm to the material.

The "Wavemaster" is independent of a hot water supply as it can be filled and heated on a cooker ring or hotplate and when necessary be used for boiling. It is capable of dealing with 3 lb of dry clothes and can also be used as a dye bath and, when not in use, as a linen basket. Fully guaranteed for twelve months, it retails at £18 7s 0d plus £6 12s 10d purchase tax in the United Kingdom.

"Wedge" Type Lampholders

Following the recent reduction in cable dimensions to comply with B.S. 7 : 1953, the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2, is producing "wedge" type illumination lampholders to accommodate the new twin 7/·029in t.r.s. cable with nominal overall dimensions of 0·405in by 0·260in. The lampholders can be supplied to take either Edison screw or bayonet cap lamps, and are priced at 20s 4d per dozen.

Switch Mounting Blocks

The latest addition to the products of the Radiamp Co., Ltd., Farningham Road, London, N.17, is a moulded switch mounting block, which will enable contractors to comply with Regulation 404J of the I.E.E. Wiring Rules. In appearance it is similar to the company's all-purpose block, but a recess is provided to give full protection to the leads connected to the switch. The blocks are provided with knock-outs for both side and back entries and are available either brown or white.

Instrument Soldering Iron

The latest addition to the range of soldering irons made by Adcola Products, Ltd., is one for use on very fine work such as the soldering of hair springs of measuring instrument movements, hearing aid circuits, etc. It has a ¼in adjustable bit and can be supplied for any voltage range up to 230/250 V. The weight, complete with 2 yd of cable, is 4 oz and the length 7¾in. The working temperature of the bit is 320 deg C.

Adcola instrument soldering iron

Brass 2 A Socket Outlet

The lifting of the ban on the use of brass has enabled the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2, to reintroduce its 2 A two-pin metal-flanged socket outlet. This outlet has a 2in diameter flange with fixing holes at 1½in centres. The price of the flanged socket outlet, finished in florentine bronze and supplied with a brown Bakelite plug, is 60s 8d per dozen. The company has also reintroduced its cream Bakelite angle backplate lampholder, the list price of which is 33s 4d per dozen.

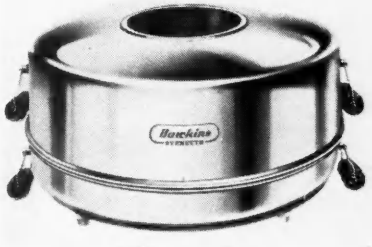
Electric "Ovenette"

A novel form of table cooker has been introduced by L. G. Hawkins & Co., Ltd., 30–35, Drury Lane, London, W.C.2. It is of circular form, comprising a 14in diameter base in which a 700 W coil element with bead insulation is enclosed in a circumferential top rim; a 12in circular wire stand; a 3¼in deep "collar" fitting into this base and a cover with a circular glass inspection window in the top. The collar is used only when extra height is required. The base and cover are fitted with heat-proof handles.

The arrangement is claimed to give perfectly uniform heat and it is certainly a convenient appliance for those living in small flats or bed-sitting rooms which have no proper cooking facilities. It has a chromium plate finish.

At a demonstration last week, at which the "Ovenette" was introduced by Mr. Gilbert Harding, a number of the cookers were in operation containing various dishes—chickens, sausages, puddings, etc., to show the versatility of the appliance. The price is 89s 6d.

L. G. Hawkins "Ovenette"



Financial Section

STOCKS and SHARES

SECOND thoughts on last month's reduction in Bank Rate took the top off the big rise in prices which had been the initial reaction of the gilt-edged market. Government stocks were nevertheless left well above their previous levels, and are now around the best seen for nearly two years. British Electricity stocks show 10s improvements in two of the issues. The 4½ per cent has been held to a large extent by the Government Departments which, in accordance with the modern technique, commonly take up a proportion of big new gilt-edged issues, with a view to peddling it out by degrees to the market. This so-called "tap" is now reported to have been turned off.

Electrical Equipment Shares

Taking their cue from the gilt-edged market, industrials tended to come back a little from the previous week's best prices, but maintained a generally firm front. Few of the latest changes among electrical equipment shares have been of much significance. Developments of interest were I.C.I.'s decision to raise the interim dividend from 5 to 6 per cent, and the Pressed Steel Company's announcement of a 100 per cent capital bonus. There were sharp rises in the shares concerned, to 49s 3d and 24s 6d respectively. Ericssons are 1s 9d up at 40s 9d, and London Electrics at 63s 9d have gained 3s. The rise in Southern Areas continued up to 17s 6d. There was a jump in Ultra Electrics to 7s 9d and in De la Rue to 9s 9d.

G.E.C. Meeting

Taxation absorbed 69 per cent of the General Electric Company's profits in the latest financial year, and, in the past six years, has withdrawn £18½ million from the company's revenue, or more than four times the net amounts distributed to stockholders. Sir Harry Railing's speech at the annual meeting emphasizes the manner in which taxation beyond a certain point produces an inflationary effect in depriving industry of the ability to finance new equipment and enterprises. In other respects, his review confirms the impression that the responsibility for the reduction in the past year's profits resided mainly in the consumer-goods side of the business, which, however, is now seeing signs of improvement. G.E.C. shares have picked up lately to 39s 6d, after being down last month to 37s 6d.

Sturtevant Dividends

Sturtevant 5s ordinary shares were marked up 2s to 28s after the declaration of the 5½ per cent (tax-free) interim dividend. It is ¼ per cent up on last year's corresponding payment, and applies, furthermore, to capital increased since then by a one-for-seven share bonus. Another free distribution, in the proportion of one new share for every eight old shares held, is to be given (subject to approval) early next month. This will make the fifth successive year of bonus distributions, in the course of which the issued ordinary capital will have been raised from £123,300 to £443,800. The amount distributed in ordinary dividend has also been increased on each of the last five occasions. Last year's total payment was equivalent to 18·1 per cent on the present capital.

Cossor Capital

Shareholders in A. C. Cossor can expect to receive within two or three weeks the details of the proposed issue of ordinary shares. At the meeting held to approve the creation of a further 2½ million shares, Lord Burghley said that this did not necessarily mean the issue of the whole amount at once; capital is to be raised in accordance with the needs of the business. He confirmed that existing shareholders are to have prior rights of subscription. The prospect of this operation tends to keep the price of the shares on the dull side at about 8s 6d.

Plessey Accounts

The Plessey Company will now be making up its accounts for the year ended in June last, and the final dividend, with the preliminary results, is expected in a few weeks' time. A substantial expansion of earnings during the two previous years was dealt with very conservatively, the dividend being raised from 20 to 25 per cent, the last payment involving the distribution of no more than a sixth of the surplus available. Indeed, the amount charged for excess profits levy was by itself more than double the net amount of the ordinary dividend. These circumstances account for the small present return on the 5s shares, and for the recent rise in the quotation to 28s 3d, the highest for many years.

Brook Motors Bonus

Brook Motors 10s ordinary shares have been marked up in recent weeks to 38s 9d as a result of the company's decision to issue a capital bonus early this month. The new shares are to be given in the proportion of one share for every six shares at present held. They will rank equally with the old in all respects, including

the final dividend for the year just ended. Unless something unforeseen happens, the board expects to pay on the increased capital the rate of 15 per cent as before. Assuming the maintenance also of the total dividend for the year at 20 per cent, the prospective yield on the shares, when quoted ex-bonus, would be over 6 per cent.

Company	Dividend Previous	Dividend Last	Middle Price 28th Sept. 1953	Week's Rise or Fall	Est. Yield p.c. £	s	d
Gilt-edged and Overseas Stocks							
Brit. Elec. 1968/73	3	3	89	—	3	7	6
Brit. Elec. 1974/77	3	3	88	+½	3	8	2
Brit. Elec. 1976/79	3½	3½	94½	—	3	14	0
Brit. Elec. 1974/79	4½	4½	102	+½	4	3	4
Calcutta Elec. ..	6†	6†	20/-	—	6	0	0†
East African Power	7	7	24/-	−6d	5	16	9
Nigerian Elec. ..	10	10	24/-	—	8	6	8
Palestine Elec. "A"	5†	Nil	16/6	+6d		—	
Perak Hydro-Elec.	Nil	Nil	16/6	—		Nil	
Equipment and Manufacturing							
AberdareCables(5/-)	20	25	8/6	—	7	7	0*
Aerialite (1/-) ..	83½	88½	8/9	—	10	1	10
Allen, W. H. ..	15	15	46/-	—	6	10	5
Aron Elec. Ord. ..	15	20	42/6	—	9	8	2
Assoc. Elec. Ord.	20	20	78/9	—	5	1	6
Automatic Tel. & El.	15	15	60/-	—	5	0	0
Babcock & Wilcox	18	18	66/6	—	5	8	3
Baldwin, H. J. (2/-)	20	20	4/3	—	9	8	4
Bakelite (10/-) ..	—	12½	19/6	—	6	8	3
British Aluminium	12	12	37/6	−6d	6	8	0
B.I. Callender's ..	9	10	38/-	+6d	5	5	3
British Thermostat (5/-)	30	35	17/6	—		—	
British Vac. Cleaner (5/-)	25	25	13/3	+3d	9	8	8
Brook Motors (10/-)	20	20	38/9	—	5	3	3
Brush Ord. (5/-) ..	10	4	4/-	—		—	
A. F. Bulgin (1/-)	30	30	3/-	—	10	0	0
Burco (5/-) ..	38½	35	18/9	+6d	9	6	8
Chloride El. Storage	15	20	77/6	—	5	3	3
Cole, E. K. (5/-) ..	25	25*	18/6	−6d	6	15	3
Cossor, A. C. (5/-)	Nil	10	8/6	—	5	17	8
Crabtree (10/-) ..	17½	17½	29/-	—	6	0	8
Crompton Parkinson Ord. (5/-) ..	11½	11½	11/9	+3d	4	15	9
De La Rue (5/-) ..	35	Nil	9/9	+1/-		—	
Decca (5/-) ..	112½	150	31/9	—	4	14	6*
Dewhurst (2/-) ..	22½	19*	5/6	—	6	18	3
Dictograph Tel.(2/-)	20	20	5/6	—		—	
E.M.I. (10/-) ..	12	12	14/-	−6d	8	11	6
Electrical Components (5/-) ..	20	20	10/-	—	10	0	0
Elec. Construction	15	15	52/6	—	5	14	3
Enfield Cable Ord.	7½	5	21/3	—	4	14	0
English Electric ..	15	15	53/9	—	5	11	6
Ericsson Tel. (5/-)	22†	22*†	40/9	+1/9	2	13	5†
Ever Ready (5/-)..	35	35	27/-	—	6	9	8
Falk Stadelmann	15	15	43/3	+3d	6	18	9
G.E.C. Ord. ..	22½	11½*	39/6	+6d	5	14	0
General Cables (5/-)	30	30	16/3	—	9	4	8
Greenwood & Batley	15	17½	40/9	+9d	8	11	9
Hackbridge Cable (5/-)	20	20	12/9	—	7	17	0
Hackbridge Hewittic (5/-)	20	20	17/6	—	5	14	2
Hall Tel. Acc.(10/-)	10	10	10/-	—	10	0	0
Heatrae (2/-) ..	12½	12½	4/-	—	6	5	0
Henleys (10/-) ..	20	10½*	17/-	—	6	3	6
Holophane (5/-) ..	15	20*	12/6	—	8	0	0
Hoover (5/-) ..	35	25	25/9	−6d	4	17	1

Company	Dividend Previous	Dividend Last	Middle Price 28th Sept. 1953	Week's Rise or Fall	Est. Yield p.c. £	s	d
Equipment and Manufacturing (continued)							
Intl. Combustion (5/-)	25	15*	14/3	—	5	5	3
Johnson & Phillips	15	15	52/-	−6d	5	15	5
Lancashire Dynamo	12½	12½	43/9	—	5	14	3
Laurence, Scott (5/-)	15	15	12/9	—	5	17	8
London Elec. Wire	12½	15	63/9	+3/-	4	14	1
J. Lucas	7½	9½	43/-	—	4	5	3
Marryat & S. (2/-)	22½	22½	5/9	—	7	16	6
Mather & Platt ..	12½	15	51/6	—	5	16	6
Metal Industries ..	15	12*	40/6	+3d	5	18	6
Mid. Elec. Mfg. ..	15	15	60/-	—	5	0	0
Murex	15	15	54/-	−6d	5	11	0
Newman Ind. (2/-)	10	10	2/3	—	8	17	9
Oldham & Son (1/-)	35	17½*	2/6	—	7	0	0
Parnall (Yate) (5/-)	6	6	3/3	−3d	9	4	8
Parsons, C. A. ..	10*	12½	72/6	—	3	9	0
Plessey (5/-) ..	22½	25	28/3	+1/6	4	8	6
Pye Deferred (5/-)	18	20	19/3	+3d	5	4	0
Revo (10/-) ..	27½	27½	16/3	—		—	
Reyrolle	10*	12½	65/-	—	3	17	0
Scot. Cable (4/-) ..	32	20*	13/-	+3d	6	3	0
Siemens Ord. ..	10	10	35/-	—	5	14	4
Southern Areas ..	5	6	17/6	+6d	6	17	3
Strand Elec.(5/-)..	17½	17½	8/3	—	10	12	2
Sturtevant (5/-) ..	17½†	18·1*†	28/-	+2/-	3	4	6†
Sun Elec.	15	15	25/-	—	12	0	0
Switchgear & Cowans (5/-)	22½	22½	14/-	—	8	0	9
Taylor, T. (5/-) ..	20	25	20/-	—	6	5	0
T.C.C. (10/-) ..	20	20*	40/-	—		—	
T.C. & M. ..	10	8½*	28/6	—	5	19	1
Telephone Mfg. (5/-)	10	10	7/6	—	6	13	4
Thorn. Elec. (5/-)	10	12½	11/-	—	5	13	8
Tube Investments	25	15*	62/-	+1/-	4	16	9
Vactric (5/-) ..	Nil	Nil	7/6	+⅛		—	
Veritys (5/-) ..	7½	10	4/6	—	11	2	2
Walsall Conduits (4/-)	70	70*	44/6	—	6	5	10
Ward & Goldstone (5/-)	45	45*	39/-	—	5	15	9
Watford (2/-) ..	25	25	5/3	+3d		—	
Westinghouse Brake	14	15	57/6	—	5	4	2
West, Allen (5/-) ..	15	15	12/3	—	6	2	5
Trusts, Transport and Communications							
Anglo-Am. Tel.: A Ord.	—	6	85½	+1	7	0	4
Ord.	—	3⅜	57½	—	6	10	5
Anglo-Portuguese	8	8	22/3	+6d	7	3	9
Brit. Elec. Traction: Def. Ord. (5/-) ..	25	35	30/6	+9d	5	14	9
Cable & Wireless: Ord.	8	8	134½	—	5	19	0
4% Loan ..	4	4	97	—	4	2	6
Calcutta Trams ..	6†	6†	19/6	—	6	3	0†
Cape Elec. Trams	5	5½	10/-	—	11	0	0
Marconi Marine ..	10	10	27/6	−6d	7	5	6
Oriental Tel. Ord.	16	16	70/-	—		—	
Telephone Props.	8	8	5½	−¼		—	
Tele. Rentals (5/-)	10	10*	9/3	—	5	8	1

* After capital bonus. † Dividends are paid free of income tax.

The above quotations are based upon the middle prices given in the Stock Exchange Daily Official List.

REPORTS and DIVIDENDS

Thorn Electrical Industries, Ltd.—In the course of his speech at the annual meeting held on 23rd September, Mr. J. Thorn (chairman) said that the Ferguson Radio and Television Division had had a successful year. Substantial capital expenditure had been incurred in increasing production capacity for television and the new factory at Enfield was one of the most modern of its kind. Sales of RG models reached a new record, and although the rising popularity of television caused a general decline in the sales of sound receivers during the year, they not only maintained their sales but actually increased their percentage of the total market. The Atlas Lighting Division continued to make excellent progress, and during the year under review a new building had been erected on their Enfield site to house all sections of their lighting research laboratories. A recent achievement had been a still further increase in the efficiency of their fluorescent tubes. A large sum of money had been spent on high-speed fully automatic lamp making machinery. The Illuminating Engineering Department had designed high bay fluorescent lighting such as was installed in a new power station of the B.E.A. A simplified type of dimming control had been developed which should open up a wider prospect of display lighting for the future. The subsidiaries selling lighting equipment had made a contribution towards last year's results. The new range of radio receivers designed for export was being well received, and further substantial contracts had been received from the United States Government for supply of communications equipment to N.A.T.O. Forces in Europe.

The General Electric Co., Ltd., held its annual meeting on 24th September, Sir Harry Railing (chairman and joint managing director) presiding. In presenting the report and accounts for 1952-53, Sir Harry said the company's activities last year showed overall a further increase both in production and in sales. The increases in production and sales since the war were mainly due to the higher output of capital goods, the great demand for which had led to a large volume of long-term contracts. Most of their works had also devoted a considerable part of their capacity to the armament drive on highly specialized work. The order book in capital goods was still on a satisfactory level, though incoming orders from abroad had declined on account of the shortage of available capital and the demand for long-term credits, and because of increased price competition.

The conditions for the sale of consumer goods, on the other hand, were particularly unfavourable both at home and abroad, sales declining sharply in the electrical industry as in most other consumer industries. Home sales decreased because of the continued ban by the B.E.A. on the promotion of sales of domestic appliances which affected the sales of switchgear, wiring supplies and meters. This ban was introduced mainly to divert these commodities to the export market, but the measure had lost any merit it might once have possessed. The export demand for these goods dropped abruptly when, after the Commonwealth Conference, the Dominions, particularly Australia, further restricted their imports. Australia's measures meant a cancellation to the G.E.C. of £600,000 of consumer goods. There were indications of an improvement with regard to consumer goods at home on account of the new policy of the B.E.A., and overseas, because of a slight alleviation of the restrictions in some of the export markets.

Orders for home power stations still stood at a figure which was considered inadequate eight years ago by all the experts and by the National Government. Sir Harry said that he had asked in every chairman's speech for a change in power plant policy for the sake of efficiency and productivity at home and he now added the argument that this change had become equally essential for the maintenance of our exports.

The inflation caused by wage advances had either to be met by raising their prices, or by a corresponding reduction in profit. They had decided on the latter in view of world competition, in the interest of permanent employment, and in the hope that the long-term outlook would justify their judgment. The increased rates conceded by the engineering industry, and the consequent adjustments, meant an additional cost to the company of £1,500,000 in wages and salaries alone. To this had to be added the rise in cost of services, such as coal, transport, gas and electricity. It was obviously impossible to contemplate further increases without disastrous results, unless the increased cost could be recovered from the consumer.

Sir Harry reviewed some of the most outstanding developments and achievements during the year. These included new extensions at Witton and Erith which now enabled the company to produce power units of 120 MW and larger capacity. Orders were in hand for fifteen hydrogen cooled sets of 60 MW, and two 30 MW units for the first B.E.A. power station to be erected at the pithead. The Pirelli-General Cable Works, Ltd., received an order for a 300 kV oil-filled cable for the Aluminum Co. of Canada, and an experimental 275 kV cable of similar type had been installed for the B.E.A.

In the field of transport, delivery had been completed of equipment for forty electric locomotives for the South African Railways. In marine electrification, contracts had been received from one shipowner for twelve complete equipments each comprising two 500 kW turbo-alternators and main a.c. switchgear.

They continued to supply a large proportion of the electrical equipment required by all sections of industry at home and abroad. Unusual lighting contracts included the lighting of the Grand Mosque at Mecca and the supply of over 5,000 floodlights as part of the anti-bandit security measures in Malaya.

In 1950 new laboratories were opened at Stanmore devoted exclusively to radar and guided weapons for the defence Ministries. Associated with these new laboratories, a corresponding expansion of the engineering effort at their Coventry group of factories had taken place, and plans were now in hand for the production of the equipment.

The Sterling Cable Co., Ltd.—The annual meeting was held on 22nd September. In his circulated statement, Mr. J. S. Clarke (chairman and managing director) said that export sales during the year under review increased by some 15 per cent. Supplies of raw materials, particularly copper, eased considerably, and since the issue of the accounts, Government control of copper had ended. There were encouraging signs that the world prices of copper, lead, tin and other metals would once again be based on London Metal Exchange quotations. Although the order book was healthy it had not yet reached the level of this time last year. He was confident, however, that the situation would improve as the result of the "freeing" of their main metals, together with the fact that Continental and overseas manufacturers could be expected to base their own raw material costs on the same market quotations.

The Palestine Electric Corporation, Ltd.—The annual meeting was held on 30th September, Viscount Samuel (chairman) presiding. In his circulated statement, the chairman said that in spite of increased tariffs and economic difficulties prevailing during the year, sales of electricity in 1952 were 638 million kWh, an increase of 106 million over 1951. The transmission and distribution system had been extended by 300 km, making the total length of lines 4,313 km. During the year 22,660 consumers were connected, bringing the total up to 231,722. The total capacity of the distribution transformers was increased to 329,800 kVA. Despite the commissioning of an additional 50,000 kW unit at the end of 1951, the available generating capacity was insufficient to meet the full peak demand last year. The situation was aggravated by a breakdown of one generating unit and it was found necessary to restrict supply during the summer months. In June this year, with the commissioning of the first of two 50,000 kW units, all restrictions were removed. It was expected that the commissioning next year of a second 50,000 kW unit, and the further additions to the generating and distribution equipment, which were planned, would enable the supply of electricity to keep pace with the demand for some considerable time to come. It was proposed to construct a new power station in the South to house plant with a capacity of 140,000 kW, part of which was on order. The generating capacity of the undertaking was therefore expected to reach 370,000 kW by 1956.

Viscount Samuel dealt with the problem of finance required for these extensions of the undertaking and gave particulars of the terms which had been reached with the Israeli Government.

A. C. Cossor, Ltd.—A further large increase in turnover was mentioned by Lord Burghley (chairman) at the annual meeting held on 23rd September in his review of the company's activities for the past year. He said that the turnover of the group rose from £5¾ million to £7¼ million, of which £1½ million was for export. The increase in turnover was not, however, accompanied by a corresponding increase in profit. Government contracts accounted for a considerable part of the increase and profit rates on Government work were strictly limited. Although the Sterling Cable Co., Ltd., had another record year, their other subsidiaries had a rather lean time; though all of them showed profits, these were less in every case than for the previous year. Although there had been some levelling off in the rearmament programme lately, and some lightening of the load upon them, they were still heavily engaged.

Ferranti, Ltd., report a group net profit for the year ended 30th June last of £436,248, as compared with £529,208 for 1951-52, after providing £847,785 for taxation and after crediting the net profits of the subsidiary companies of £76,078. A dividend of £11,002, after tax, from the Canadian subsidiary has been credited to the parent company's appropriation account. The American subsidiary has incurred a loss which it has carried forward. General reserve receives £300,000. The ordinary dividend for the year is maintained at 6 per cent, but is paid this time on capital raised to £1,000,000 from £500,000 by an issue of fully-paid shares. The balance carried forward is £314,750 (against £270,063 brought in).

The Pressed Steel Co., Ltd., announces a scrip distribution of one 5s ordinary share for every 5s ordinary stock held. The proposal is subject to Treasury consent. For the share

distribution £1,657,222 will be capitalized from reserves and undivided profits and the issue in total will amount to 6,628,888 5s shares. The new shares will rank for all future dividends including the interim shortly to be announced.

The Kalgoorlie Electric Power & Lighting Corporation, Ltd., reports a net profit for 1952, after meeting all charges, of £10,710, as compared with a loss of £3,507 for 1951. No dividend is recommended (same).

The Telephone & General Trust, Ltd., has declared an interim dividend of 3 per cent (unchanged).

The Sturtevant Engineering Co., Ltd., has declared an interim dividend of 5½ per cent, free of tax (unchanged). It is proposed to issue 197,256 new shares in the proportion of one for eight shares held, by capitalizing £49,314 from general reserve. The new shares will not rank for the above interim dividend.

The Electrolytic Zinc Co. of Australasia, is paying a final dividend of 27½ per cent on the 5s preference and 5s ordinary units, making 40 per cent for the year. This is a reduction of 5 per cent on the preceding year.

Crossley Brothers, Ltd., report a consolidated trading profit for the year to 30th April last of £437,772, as compared with £479,966 for 1951-52, and after meeting all charges, including £176,914 for taxation, the net profit is £140,722 (against £148,991). It is proposed to pay a final dividend on the deferred ordinary capital of 10 per cent, again making 15 per cent for the year.

New Companies

Super Electric Products (Walsall), Ltd.—Registered 19th September. Capital £1,500. Tool, pattern and machinery designers, mechanical and general engineers, etc. Directors : K. W. Cornfield, C. A. R. Dance and J. C. Higgs. Regd. office : 77, Blue Lane West, Walsall.

Wix of London, Ltd.—Registered 19th September. Capital £1,000. Mechanical, electrical, radio, television, electronic and air conditioning engineers, etc. The first directors are to be appointed by the subscribers. Solicitors : Herbert Oppenheimer & Co., 20, Copthall Avenue, E.C.2.

Telesan, Ltd.—Registered 18th September. Capital £1,000. Manufacturers and sellers of telephonic equipment of all kinds, etc. Directors : G. S. Lavender, A. Wolman, N. Trup and L. Wilson. Regd. office : Queen's House, Leicester Square, W.C.2.

Daytona Wholesale Electrical, Ltd.—Registered 21st September. Capital £2,000. Electrical, television and mechanical engineers and manufacturers, etc. Directors : G. A. Day and Mrs. Dorothy K. Day, addresses not stated. Solicitors : Glanvilles, Havant Hants.

Monks of Wimbledon (1953), Ltd.—Registered 17th September. Capital £100. Electrical engineers and contractors, etc. Directors : D. Abbott, L. E. Monks and S. W. Monks. Regd. office : 139, The Broadway, Wimbledon, S.W.19.

Liquidations

Onchan Electrical & Radio Services, Ltd.—Meeting of members on 20th November at St. George's Chambers, 1, Athol Street, Douglas, I. of M., to receive an account of the winding-up by the liquidator, Mr. J. W. Manderson.

Electronics (Clayton), Ltd.—Creditors' voluntary winding-up. Meetings of members and creditors on 27th October at the offices of H. B. Britcliffe & Co., 15, Avenue Parade, Accrington, to receive an account of the winding-up by the liquidator, Mr. E. Hodgkinson.

Bankruptcies

C. F. Burns, High Street, Stalham, Norfolk, electrical and radio engineer.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released 16th September, 1953.

J. H. Trevithick, electrician, partner in the firm of Power, Light & Sound, 51, Fore Street, Callington, Cornwall.—Trustee, Mr. F. B. Goodman, 24, Lockyer Street, Plymouth. Official Receiver, released 16th September, 1953.

F. A. Walmsley, 48, Wyle Cop, Shrewsbury, Salop, electrical contractor.—Trustee, Mr. F. C. Ormrod, 12, Lonsdale Street, Stoke-on-Trent, released 16th September, 1953.

N. H. Green, 66, London Road, Coalville, Leics, electrician.—Trustee, Mr. E. C. Stimpson, 22, Regent Street, Park Row, Nottingham, Official Receiver, released 18th September, 1953.

H. W. Daldry, residing at 57, Lower Cliff Road, and lately carrying on business at 168, Bells Road, Gorleston-on-Sea, Suffolk, electrician.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released 22nd September, 1953.

A. J. Coles, 424, Pinner Road, Harrow, Middx, lately carrying on business at 2a, Pinner Road, Harrow, electrical engineer and contractor.—Last day for receiving proofs for dividend 10th October. Trustee, Mr. W. J. Wallis Hill, 58-61, York Terrace, Regent's Park, London, N.W.1, Official Receiver.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 11th November, from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1949

8913. Mullard Radio Valve Co., Ltd., and Knott, G.—Ultra-high frequency electrical amplifiers and oscillators. 31st March, 1950. (699631.)

21538. British Thomson Houston Co., Ltd.—Electric-discharge devices. 18th August, 1949. (699632.)

25818. Sereno, P.—Fluorescent sign lamps. 7th October, 1949. (699634.)

1950

3403. Automatic Coil Winder & Electrical Equipment Co., Ltd., and Wilkins, S. R.—Attenuators and resistive networks. 3rd May, 1951. (699684.)

6273. Eliasen, E. A. B., and Jensen, K. H. F.—Telegraphic code translator. 13th March, 1951. (699685.)

20890. Metropolitan-Vickers Electrical Co., Ltd.—Electrical protective gear for alternating current systems. 10th July, 1951. (699638.)

29247. British Thomson-Houston Co., Ltd.—Clothes washing machines. 29th November, 1950. (699695.)

30715. National Research Development Corporation.—Multi-electrode gaseous-discharge tube circuits. 28th December, 1951. (699696.)

1951

73. Robertshaw-Fulton Controls Co.—Assembly comprising a pilot burner and a thermoelectric element to be heated thereby. 1st January, 1951. (699698.)

6586. Compagnie Générale de Télégraphie sans Fil.—Manufacture of vacuum tight envelopes for electron-discharge tubes. 19th March, 1951. (699651.)

6904. Associated Electrical Industries, Ltd.—Smoothing circuits. 13th March, 1952. (699469.)

9408. Schwab, M.—Electric motor equipment for sewing machines. 23rd April, 1951. (699473.)

13248. Ferranti, Ltd.—Electronic-gate circuits. 28th August, 1952. (699585.)

13383. Dominitwerke Ges.—Mine lamps with fluorescent tube. 6th June, 1951. (699478.)

14450. Edison Swan Electric Co., Ltd.—Manufacture of fluorescent screens. 6th May, 1952. (699660.)

14569. General Electric Co., Ltd., and Buckingham, J. D.—Apparatus for measuring gas pressure. 1st August, 1952. (699527.)

16048. Lohmann-Werke Akt.-Ges.—Multipolar dynamo for pedal cycles, motor cycles and the like. 6th July, 1951. (699482.)

17292. Glossl, K. Schaffler-, (trading as Schaffler & Co.).—Means for igniting electrically ignitable detonators. 20th July, 1951. (699586.)

18775. Riley & Neate, Ltd., and Clarence, W. A.—Means for attaching electric conductors to insulators. 8th August, 1952. (699535.)

20274. General Electric Co., Ltd., and Harling, D. W.—Arrangements for modulating electric carrier wave oscillations. 14th August, 1952. (699539.)

20826. English Electric Co., Ltd.—Cable and identification ferrules and the like. 2nd September, 1952. (699485.)

21001. Metropolitan-Vickers Electrical Co., Ltd.—Magnetic amplifiers. 7th August, 1952. (699542.)

21106. Edison Swan Electric Co., Ltd.—Television. 6th September, 1951. (699713.)

21256. Pirelli-General Cable Works, Ltd., and Wilson, W. A.—Multi-channel fluid conduits. 14th August, 1952. (699543.)

22406. Metropolitan-Vickers Electrical Co., Ltd.—Magnetic core structures. 25th August, 1952. (699549.)

22786. Automatic Telephone & Electric Co., Ltd.—Housing arrangements for electrical components. 16th September, 1952. (699550.)

22949. National Research Council.—Dynamometer. 2nd October, 1951. (699668.)

25685. English Electric Co., Ltd.—Liquid-level regulators. 28th October, 1952. (699491.)

25696. Crypto, Ltd., and Wilson, E. P.—Meat-mincing machines. 2nd November, 1951. (699589.)

26156. Heinrich, R. F.—Electrostatic precipitators. 8th November, 1951. (699670.)

27307. Leece-Neville Co.—Voltage regulation apparatus. 21st November, 1951. (699719.)

27309. Redmond Co., Inc.—Dynamo-electric machines. 21st November, 1951. (699672.)

27460. Mycalex Corporation of America.—Terminal structures for electrical apparatus. 22nd November, 1951. (699492.)

28102. Armstrong Whitworth Aircraft, Ltd., Sir W. G.—Guide for electromagnetic micro-waves. 19th September, 1952. (699494.)

28258. Heinrich, D. O.—Electrostatic precipitators. 3rd December, 1951. (699720.)

28770. Bendix Aviation Corporation.—Squelch circuit for radio receivers. 7th December, 1951. (699592.)

1952

1374. British Thomson-Houston Co., Ltd.—Electric transformers. 3rd November, 1952. (699594.)

1902. Glover & Co., Ltd., W. T.—Electric cables. 22nd January, 1953. (699558.)

5559. Compagnie Générale de Télégraphie sans Fil.—Apparatus for measuring magnetic fields. 3rd March, 1952. (699597.)

19911. General Electric Co.—Current regulators. 7th August, 1952. (699606.)

20461. Philips Electrical Industries, Ltd.—Cylindrical or cup-shaped capacitors having a ceramic dielectric. 14th August, 1952. (699610.)

20659. General Motors Corporation.—Apparatus for electrically detecting and indicating the degree of smoothness of a surface. 18th August, 1952. (699728.)

22539. General Electric Co.—Fluid-cooling systems. 8th September, 1952. (699618.)

22822. Philips Electrical Industries, Ltd.—Discharge tube circuits for producing a saw-tooth current. 11th September, 1952. (699566.)

23240. General Electric Co.—Compression refrigerating systems. 16th September, 1952. (699568.)

23861. Telefunken Ges., für Drahtlose Telegraphie.—Frequency shift telegraph receivers. 23rd September, 1952. (699729.)

24708. General Electric Co.—Refrigerator evaporators. 2nd October, 1952. (699508.)

24709. General Electric Co.—Refrigerator evaporators. 2nd October, 1952. (699509.)

24823. Mullard Radio Valve Co., Ltd.—High-frequency electrical energy absorbing devices. 3rd October, 1952. (699510.)

24824. Philips Electrical Industries, Ltd.—Electrode systems. 3rd October, 1952. (699622.)

32855. British Thomson-Houston Co., Ltd.—Dynamo-electric machines. 29th December, 1952. (699570.)

NEXT WEEK'S EVENTS

Monday, 5th October

BIRMINGHAM.—Grand Hotel, 6 p.m. I.E.E. South Midland Centre. Annual general meeting. Chairman's Address by H. J. Gibson, and conversazione.

ILFORD.—Angel Hotel, 8 p.m. A.S.E.E. North East London Branch. Films.

LEEDS.—The Great Northern Hotel, 7.30 p.m. A.S.E.E. Leeds Branch. "M.I. Cable," by W. Cameron.

LIVERPOOL.—At the Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. Chairman's Address by T. Coates.

LONDON.—Burlington House, W.1, 5.30 p.m. Society of Engineers. "Surface Finish and its Measurement by Electronic Methods," by S. F. Smith.

MAIDSTONE.—At the "Wig & Gown," 7.30 p.m. I.E.E. Maidstone District meeting. "Fluorescent Discharge—Tube Circuits and Operating Problems," by J. Cates.

NEWCASTLE-UPON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio & Measurements Group. Chairman's Address by F. H. Birch.

PAISLEY.—At the canteen of Eadie Bros. & Co., Ltd., 7.30 p.m. Institution of Works Managers, Paisley Group. "Management Ethics for Foremen," by W. H. Bower.

SHEFFIELD.—Royal Victoria Station Hotel, 7.30 p.m. A.S.E.E. Sheffield Branch. Films—educational and topical.

Tuesday, 6th October

DARLINGTON.—Imperial Hotel, 1 p.m. Purchasing Officers' Association, Darlington Group. Luncheon.

EDINBURGH.—Carlton Hotel, North Bridge, 7 p.m. I.E.E. South East Scotland Sub-Centre. Chairman's Address by H. V. Henniker.

ELTHAM.—Congregational Church Hall, Court Road, 8 p.m. A.S.E.E. South East London Branch. Films.

HAMMERSMITH.—Windsor Castle Hotel, 134, King Street, 7.30 p.m. A.S.E.E. West London Branch. "The Development of the Gas Turbine for Jet Engines," by A. C. Parkes.

LEEDS.—1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. Chairman's Address, "Thinking Aloud," by G. Caton.

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers, London Centre. Chairman's Address, "Recent Developments in Subscribers' Apparatus and Services," by F. C. Carter.

At the Royal Society of Arts, John Adam Street, Adelphi, Strand, 7 p.m. Incorporated Plant Engineers, London Branch. "Patterns, Casings and Foundry Work: an Introduction," by Barnet Levy.

LOUGHBOROUGH.—Loughborough College, 7 p.m. I.E.E. East Midland Centre. Chairman's Address by C. D. Wilkinson, annual general meeting and reunion.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Centre. Chairman's Address by H. West.

RUGBY.—College of Technology and Arts, 6.30 p.m. I.E.E. Rugby Sub-Centre. Chairman's Address by A. Draper. Visit of vice-president.

Wednesday, 7th October

ABERDEEN.—Caledonian Hotel. I.E.E. North Scotland Sub-Centre. Inaugural Dinner, 6 p.m. Chairman's Address, 8 p.m.—"Retrospect and Prospect," by R. S. Goddard.

BIRMINGHAM.—James Watt Institute, Great Charles Street, 7 p.m. Junior Institution of Engineers, Midland Section. Annual general meeting and film evening.

EDINBURGH.—Manor Club, 12, Rothesay Place, 7 p.m. I.E.S. Edinburgh Centre. "Seeing and Believing," by R. W. Lawrence.

GLASGOW.—I.E.S. Building, Elmbank Crescent, 7 p.m. I.E.E. South West Scotland Sub-Centre. Chairman's Address by Prof. F. M. Bruce.

HARRINGAY.—"Queen's Head," 677, Green Lanes, N.4, 7.45 p.m. A.S.E.E. North London Branch. "Fibreglass for Electrical Insulation," by A. M. Robertson.

LONDON.—At the Institution of Mechanical Engineers, Storey's Gate, S.W.1, 5.30 p.m. Institute of Fuel. Melchett Lecture. "The Domestic Appliance Industry and Fuel Utilization," by Dr. H. Hartley.

MIDDLESBROUGH.—Cleveland Scientific & Technical Institute, 6.30 p.m. I.E.E. Tees-Side Sub-Centre. Chairman's Address by C. Richards.

NEWCASTLE-ON-TYNE.—Roadway House, 8, Oxford Street, 6.15 p.m. I.E.S. Newcastle Centre. Chairman's Address by C. C. Veitch.

Crown Hotel, Clayton Street West, 7 p.m. Purchasing Officers' Association, Tyneside Branch. "Purchasing—the Profession and the Association," by P. J. H. Bailey.

PORTSMOUTH.—Municipal College, 6.30 p.m. I.E.E. Southern Centre. Chairman's Address by Cdr. (L) C. V. Robinson.

PRESTON.—Chamber of Commerce, 49a, Fishergate, 7.30 p.m. A.S.E.E. Preston Branch. "Power Transmission by V-belts," by A. F. McAlpin.

SLOUGH.—The Community Centre, Farnham Road, 7.30 p.m. Institute of Welding, Slouth Section. "Organization for Production of Welded Ships," by D. M. Kerr.

SOUTHAMPTON.—Polygon Hotel, 7.30 p.m. Incorporated Plant Engineers, Southampton Branch. "Oxygen in Industry," lecture and films, by E. Ryalls.

SWANSEA.—Plaza Buildings, the Kingsway, 6.30 p.m. I.E.S. Swansea Group. Chairman's Address by F. M. Macpherson.

Thursday, 8th October

BRADFORD.—Y.E.B., 45–53, Sunbridge Road, 7.30 p.m. I.E.S. Bradford Group. "Lighting Problems in Industrial Photography," by R. Baron.

DUNDEE.—Royal Hotel, 7 p.m. I.E.E. North Scotland Sub-Centre. Chairman's Address, "Retrospect and Prospect," by R. S. Goddard.

GLASGOW.—At the Institution of Engineers and Shipbuilders, 7 p.m. British Institution of Radio Engineers, Scottish Section. "The Microwave Test Bench and its Components—a Practical Introduction to Waveguide Work," by J. Bilbrough.

LEEDS.—Astoria Ballroom. I.E.S. Leeds Centre. Supperdance.

LIVERPOOL.—Electricity Showroom, Whitechapel, 7 p.m. E.P.E.A. Merseyside Technical Group. "Glass—Manufacture, Types and Uses," by J. Unsworth.

LONDON.—The Institution, 5.30 p.m. Institution of Electrical Engineers. Inaugural Address by President, H. Bishop.

2, Savoy Hill, W.C.2, 6.30 p.m. Institute of Welding, South London Branch. Chairman's Address, followed by discussion—"Weld Preparations—What is the Aim?" opened by E. Fuchs, F. C. Cocks and D. M. Kerr.

Manson House, Portland Place, W.1, 7.30 p.m. Institute of Welding, North London Branch. "Automatic Welding,' by R. L. Swan.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Centre. "The Design and Operation of Dunston 'B' Generating Station with particular reference to 50-MW Turbo-Alternators unitized with Reheater Boilers," by A. Howell and J. B. Jackson. (Joint meeting with the North Western Branch, I.Mech.E.)

N.W.E.B. Town Hall Extension, 6 p.m. I.E.S. Manchester Centre. Symposium on "Lighting for Sport."

NEWCASTLE-UPON-TYNE.—Roadway House, Oxford Street, 7 p.m. Incorporated Plant Engineers, North-East Branch. "The Use of Paint in Factories," by P. J. Gay.

(*Continued at foot of next page*)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Belfast.—11th December. City Council. Stoker-fired boiler units, etc., for Belfast West power station. (See this issue.)

Cleethorpes.—8th October. Corporation. Electrical installations in 194 dwellings and six shops. (See this issue.)

Down.—8th October. County Education Committee. Electrical installation at Dundonald primary school extension. Munce & Kennedy, architects, 133, University Street, Belfast.

Edinburgh.—North of Scotland Hydro-Electric Board. 132 kV steel tower transmission lines. (See this issue.)

Formosa.—TAIPEI.—19th October. Central Trust of China. Electric power cable. (E.S.B. 4464/53. Ten/7166.)*

Longbenton.—14th October. U.D.C. Street lighting equipment. (See this issue.)

Morecambe and Heysham.—7th October. Borough Council. Electrical installation in 62 housing units. Borough surveyor.

New Zealand.—WELLINGTON.—3rd November. State Hydro-Electric Department. Eight 110 kV, 2,500 MVA circuit breakers and accessories. (E.S.B. 4427/53. Ten/7198.)* 10th November. Thirteen 110 kV, 2,500 MVA circuit breakers and accessories. (E.S.B. 4928/53. Ten/7196.)* 1st December. Four outdoor transformer units. forming 10,000 kVA 3-phase bank with spare unit. (E.S.B. 4929/53. Ten/7208.)*

South Africa.—CAPE TOWN.—21st October. City electrical engineer. One 33 kV current limiting reactor equipment. (E.S.B. 4649/53. Ten/7169.)*

Southern Rhodesia. — SALISBURY. — 16th October. Department of Posts and Telegraphs. Diesel generating sets. (E.S.B. 4986/53. Ten/7211.)*

Turkey. — ANKARA. — 10th December. Iller Bank, Hydro-Electric Branch. Machinery and electrical equipment for the Sizir Dam and at 16 substations. (C.R.E. 12266/53. Ten/7213.)*

United States. — DENVER (COLORADO).—Department of the Interior, Bureau of Reclamation. Supervisory control and telemetering equipment for the Central Valley project, California. (E.S.B. 4824/53. Ten/7199.)*

ORDERS PLACED

Aylesbury.—Corporation. Electrical installations in 120 flats at Ahaddon Chase, Buckingham Road (£4,179).—Batson & Davis.

Driffield.—U.D.C. Electrical installations in 52 houses in Eastfield Road.—D. & F. Electrical Stores, Ltd.

Glasgow.—Corporation. Stores to the Lighting Department. Street lighting sodium lanterns (£247).—G.E.C. Street lighting tungsten lanterns (£232).—Brighton Lighting & Electrical Engineering Co., Ltd. Porcelain reflectors for street lighting lanterns (£217).—Alder & Mackay, Ltd.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberystwyth.—Houses (86) at Penybont site for T.C.

Aldershot.—Public library, High Street; borough surveyor.

Barnes.—Flats (72) at Priest Bridge; W. R. Shepherd, borough surveyor, Sheen Lane, S.W.14.

Bentley.—Technical high school (£147,000) for Don Valley Divisional Education Executive; executive's architect, Doncaster.

Bingham.—Houses (45) for R.D.C.; Frost & Leatherland, Newark.

Birmingham.—Extensions at Great King Street for Joseph Lucas, Ltd.; Clifford Tee & Gale, London.

*Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

Next Week's Events

Thursday, 8th October (*Continued*)

SWANSEA.—Central Public Library, Alexandra Road, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. Chairman's Address by E. W. Cooper.

WEMBLEY.—Century Hotel, Forty Avenue, 12.45 p.m. Institution of Works Managers, Wembley Sub-Branch. "Work Study as a Factor in Industrial Efficiency," by A. G. Northcott.

Friday, 9th October

BIRMINGHAM.—At the G.E.C. Magnet Club, Witton. E.I.B.A. Birmingham Branch. Carnival dance.

LONDON.—164, Shaftesbury Avenue, W.C.2, 7 p.m. Television Society. "Recording Television Programmes," by C. B. B. Wood.

Townsend House, Greycoat Place, S.W.1, 7 p.m. Junior Institution of Engineers. "Industrial and Marine Gas Turbines," by A. W. Pope.

Saturday, 10th October

BLACKPOOL.—Institution of Works Managers, Manchester Branch. Visit to Blackpool Airport installations, dinner, lights over illuminations, etc.

Cannock.—Houses on the Old Fallow Estate (48), dwellings on site off Foster Avenue (85), bungalows in Southbourne Avenue (28), and dwellings in Laburnum Avenue (28), for U.D.C.; H. Wilcox, architect to Council, High Green.

Carlisle.—Shop premises in Lamb Street for Carlisle South-East Co-operative Society; Johnston & Wright, architects, 13, Castle Street.

Chichester.—Garage block and maintenance bay, Drayton Highways Depot; county architect, County Hall.

Chigwell. — Houses (30), Chigwell Row; Tooley & Foster, architects, Midland Bank Chambers, Buckhurst Hill.

Cleethorpes.—Extensions to pier and pavilion (£10,000) for T.C.; borough architect.

Coseley (Staffs).—Houses (52), and bungalows (6) on the Old End site; J. C. Roper, clerk to U.D.C., Council House.

Croydon.—New wing at Technical College; E. Taberner, town clerk, Town Hall.

Cumberland.—Primary school at Distington for the E.C.; county architect, Portland Square, Carlisle.

Durham.—First instalment of proposed technical college at Bishop Auckland (£68,000) for the C.C.; county architect, Court Lane.

Eastbourne.—Rebuilding stores in Terminus Road (war-damaged); Marks & Spencer, Ltd.

East Grinstead.—Primary junior school; county architect, County Hall, Lewes.

Edgware.—Houses (119), Spur Road, for Hendon B.C.; Roger Malcolm, Ltd., builders, Church Lane, N.W.9.

Gateshead.—Pithead baths at Watergate Colliery for Durham Coal Board (£94,000); R. C. Williamson (Durham), Ltd., contractors, Rowlands Gill, Co. Durham.

Extensions to factory, Hugh Wood & Co., Ltd.; Ballard, Cotton & Blow, Haymarket House, Newcastle-on-Tyne.

Factory for Robert Hirst & Co., Ltd.; Spence & Price, St. Mary's Place, Newcastle-on-Tyne.

Glasgow. — Additions to mill; Riverside Milling Co., Ltd., flour millers, 1, Shearer Street.

Harlow. — Houses (524), Netteswell, for Development Corporation; Rush & Tompkins, Ltd., builders, 109, Station Road, Sidcup.

Haverfordwest.—Out-patients' department, at County Hospital; Welsh Regional Hospital Board, Cathays Park, Cardiff.

Hillingdon. — Dwellings (63), in Corwell Lane, for Uxbridge U.D.C.; H. E. G. Stripp, surveyor, 263, High Street.

Hinckley. — Bus station and car park (£14,048) for U.D.C.; Council's architect.

Jarrow-on-Tyne.—Road tunnel under the Tyne for the Tyne Tunnel Joint Committee (£6,000,000); Mott, Hay & Anderson, consulting engineers, 9, Idesleigh House, London, S.W.1.

Liverpool.—Secondary modern school for Lancs C.C.; C. J. Doyle & Sons, Ltd., Mount Pleasant.

Extensions to factory at Edwards Lane for H. Tramer, Ltd.; Zwinger & Haddy, architects.

London.—Bethnal Green.—Flats (16), Shipton Street; borough engineer.

Holborn.—Warehouse and offices, Holborn Place; Mullen & Lumsden, Ltd., 41, Eagle Street, W.C.1.

Mincing Lane.—Office block; City of London Real Property Co., Ltd., 159, Fenchurch Street, E.C.3.

Woolwich.—Dwellings (175), Blithdale Road; county housing architect, County Hall, S.E.1.

Malvern.—Houses (52) at Pound Bank site for U.D.C.; Thos. Broad, Ltd., Graham Road.

Manchester.—Rebuilding of store at 16/18, St. Anns Square for Marshall & Snelgrove, Ltd.; B. Waterhouse, architect, 134, Deansgate.

Newcastle-on-Tyne.—Additions to factory, Barrack Road, for Charles Leach, Ltd., sweet manufacturers; Thomas Hutchinson & Co., builders, Elswick Road.

Garage, workshop and offices, Railway Street, for North-Eastern Motors, Ltd., Martins Bank Chambers, Clayton Street; own architects.

Houses (108) on the Fawdon Estate for the City Council; Wimpey & Co., Ltd., builders, Orchard House.

New Malden.—Factory, Wellington Crescent; E. A. Goodson & Son, 165, Battersea Rise, S.W.11.

North Riding.—Infants' school at Marske, Saltburn, for the E.C.; W. J. Emmerson, builder, Trenholme Road, Middlesbrough.

Nottingham.—Pollution and fisheries laboratory, Meadow Lane, for Trent River Board; Wm. Woodsend, Ltd., builders, Castle Boulevard.

Plymouth. — Houses (123), Barn Barton estate, St. Budeaux; city architect.

Portsmouth.—Houses (96), Leigh Park; city architect.

Rawtenstall.—Houses (132) for T.C.; A. Spencer, 31, Bold Street, Accrington.

Rochdale.—Extensions to factory for Carrington & Dewhurst, Ltd.; Leonard Fairclough, Ltd., Adlington, Lancs.

Smethwick.—Second instalment of Chance Technical College scheme (£130,000); R. Fletcher, borough surveyor.

Stoke-on-Trent.—Reconstruction of factory for Twyfords, Ltd.; G. Percy Trentham, Ltd., Longton.

Stourbridge.—School at Gig Mill, Norton; Jackson & Edmonds, architects to Worcs. E.C., 116, Colmore Row, Birmingham, 3.

Sunderland.—Houses (82) for the R.D.C.; direct labour.

Swindon.—Bakery and depot; J. Lyons & Co., Ltd., Cadby Hall, W.14.

Tottenham.—Flats and maisonnettes (42), on the West Green Road estate; borough engineer, Town Hall, N.15.

Truro. — Retail store, Boscawen Street; F. W. Woolworth & Co., Ltd., 1, New Bond Street, W.1.

Wrexham.—Houses (197), on the Queens Park Estate, southern area; J. M. Davies, borough surveyor, 31, Chester Street.